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ABSTRACT

Work and learning in microenterprises in the printing industries of four European Community (EC) countries were examined through 17 case studies of firms with 10 or fewer employees (5 firms in Finland and 4 each in Ireland, the Netherlands, and Spain). Structured interviews were conducted with each firm's owner and a total of 90 staff at the 17 firms. Firms were not selected randomly; rather, they were selected because of their active use of training to adapt their staff to technological, economic, and organizational change. The differences in training practices at the 17 firms proved more related to firm size than country-specific situations. Prepress firms were the most dynamic, and press firms were the least dynamic. Of the 63 employees actually involved in the printing process, 23 (36%) had no initial vocational education for the sector. Fewer than one-third of the printers interviewed (including only 4 of the 23 employees without initial vocational education) had participated in continuing training during the previous 3 years. Many employees kept their qualifications up to date through incidental learning (including learning by solving problems individually or with colleagues, asking for help from experienced colleagues, and learning under the boss or an experienced worker). (Contains 18 tables/figures) (MN)

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Work and learning in micro-enterprises in the printing industry

A comparative research study into the relationship between technological and organisational developments and training activities in micro-enterprises in the printing industry in four European countries

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Foreword

This study is a synthesis of four national reports on the relationship between the organization of work and the development of qualifications within micro-enterprises in the printing sector.

The printing sector is the third sector to be studied in CEDEFOP's pilot project on organizational change and learning in SMEs, the other two being the retail sector and car sales and repair. We decided to focus on micro-enterprises in particular because so far they have received less attention than other types of SME.

Conditions are constantly changing and enterprises must keep abreast of any changes or run the risk of becoming obsolete and ultimately of closure. The changing environment has a direct impact on the strategies which entrepreneurs employ to modernize and adapt, and those strategies in turn have an impact within companies and on the way work is organized.

And it is precisely on modernization, internal organization and learning - as an element of staff policy - that this study focuses.

Enterprises operate within sectors, and even though new technologies and automation have blurred the boundaries between them, sectors differ in many respects, for example in their technological developments and dynamics. Sectors also differ in the degree of uniformity among enterprises and products. They can have very different production processes and the importance of their relations with and dependence on other sectors may vary. And finally, training traditions and the provision of training differ considerably from sector to sector.

All those factors have a significant influence on learning and training. This study provides a detailed, well-documented and vivid picture by including extracts from the interviews conducted and giving an account of the interactions between the enterprises studied and the environment in which they operate.

The authors of the report, Mr Harry van den Tillaart, Mr Sjaak van den Berg and Mr John Warmerdam of ITS, Nijmegen, have developed a method of classifying for the enterprises' strategies on their market position, work organization and learning and training.

Their classification in fact owes a considerable debt to football (preparations for the World Cup were under way when this report was being drawn up). The sporting analogy they draw makes it easier to depict the very complex situation constituted by learning in micro-enterprises in the printing sector.

CEDEFOP wishes to thank the above mentioned authors for this synthesis report, for the Netherlands national report and for coordinating the work. It also wishes to thank Mr Tom Martin and Mr John Foley of the Dublin Institute of Technology, Mr Karsten Krüger of CIREM, Barcelona, Mr Jukka Laitinen and Mr Mikko Grönlund of the Turku School of Economics and Business Administration - Business Research and Development Centre, Media Group, for the national reports they drew up earlier and on which this report is based.

Tina Bertzeletou

Project Coordinator

Stavros Stavrou

Deputy Director

1. MAIN QUESTIONS, RESEARCH METHODOLOGY AND FIRMS STUDIED

Introduction

Organizations are confronted with significant rapid changes. They have to update the qualifications of their personnel almost constantly in order to be able to master these changes. Research has demonstrated that for many organizations constantly ensuring that their staff is adequately qualified is a big problem. Most of this research has focused on bigger organizations. Small organizations and especially micro-enterprises, i.e. organizations with up to 10 staff members, have received less attention. It is nevertheless clear that the way in which micro-enterprises are reacting to their changing environments, adapting their internal organizations and updating the qualifications of their staff are specific to this type of organization. It is therefore important to take a proper look at these processes in micro-organizations.

CEDEFOP in Thessaloniki organized such a study in the retail and car-repair sector in different EC countries: Greece, Ireland, Spain and The Netherlands. This study has clearly confirmed the specific character of the training problems in micro-enterprises and the need for a special approach to the problem in such organizations. To follow on from the project in the retail and car-repair sector, CEDEFOP organized a research project to study the problem in a similar way in the printing industry. Given the specific rapid technological development in this sector, it is appropriate to study how small enterprises are managing to survive and the role of training in this process.

Training in small companies

Various research studies in micro-enterprises in different countries have demonstrated that the role of the owner/entrepreneur is generally a decisive factor in determining how companies are structured and how they adapt to change.

To take one example. The findings of a survey into the continuing vocational training of employees in 400 small Dutch companies indicate that the entrepreneurial and managerial skills of the owners of small-businesses play an important role (see figure 1).

More than forty percent of the owners of small businesses, in particular the smallest businesses with few if any employees (the so-called *self-employed* and *family businesses*), are virtually or totally unaware either of the changes taking place outside their company (type 1 in figure 1) or of the consequences that these changes could or should have for their company (type 2 in figure 1). It is therefore obvious that they do not realize the importance of adapting and modernizing their companies and style of management. The fact that the further training of the staff in such companies is neglected is thus primarily due to a *lack* of or at least inadequate *entrepreneurship*. After all, alongside risk-taking, external orientation is a key element of entrepreneurship.

More than half of all owners of small businesses, in particular the so-called *small employers*, appear to have a reasonable or good eye for the dynamics of their surroundings (type 3, 4, 5 in figure 1), and they almost all realize that they too must invest time and money in training their staff. Nonetheless, even in such cases, (too) little comes of it. Sometimes this may be because there is no adequate training available. More often, however, the cause is *insufficient managerial skills*. Small-business owners often appear to have great difficulty in framing an adequate personnel and training policy.

In total only 23% of these 400 small-business owners have invested (a lot of) money in the development of new products or services in the last three years. Nearly half (46%) of these 400 small-business owners have invested (a lot of) money in the renewal of machinery and (technical) resources in the last three years, but the proportion varies considerably among the five types in figure 1:

type 1: 27 %

type 2: 35 %

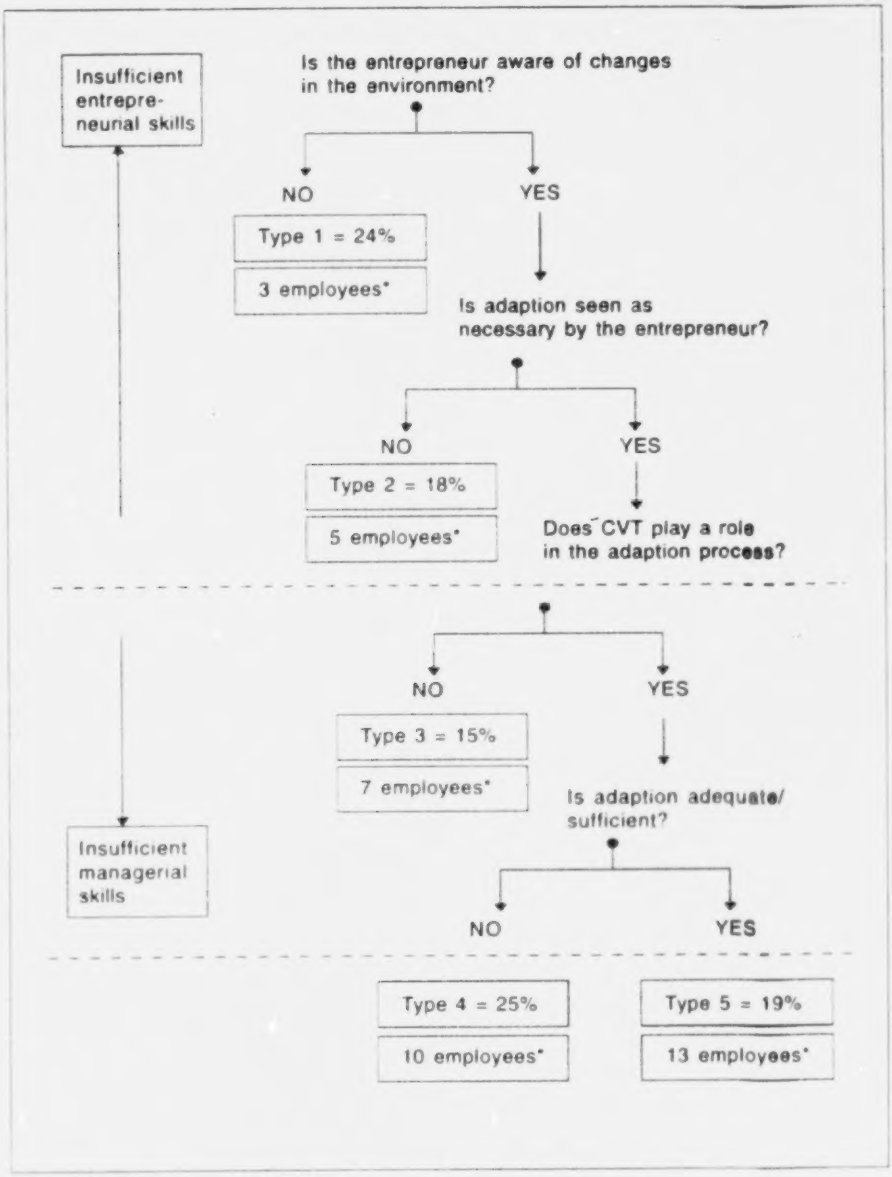
type 3: 57 %

type 4: 49 %

type 5: 65 %

One important conclusion is that in small enterprises there is a strong link between the skills of the entrepreneur, the effort he puts into the continuous vocational training of his staff and his efforts to modernize his firm. These findings clearly indicate that the participation of SME staff in continuing vocational training depends to some extent on the skills of the small-business owners, in particular on their entrepreneurial (external orientation: monitoring changes and developments in the environment) and managerial skills (internal orientation: designing an adequate personnel and training policy).

Figure 1: Continuing vocational training and the adaptation process in small firms


Insufficient entrepre-neurial skills
Is the entrepreneur aware of changes in the environment?
NO
YES
Type 1 = 24%
3 employees*
Is adaption seen as necessary by the entrepreneur?
NO
YES
Type 2 = 18%
5 employees*
Does CVT play a role in the adaption process?
NO
YES
Type 3 = 15%
7 employees*
Is adaption adequate/ sufficient?
Insufficient managerial skills
NO
YES
Type 4 = 25%
10 employees*
Type 5 = 19%
13 employees*

Source: H. van den Tillaart, J. Frietman and J. van den Berg, 1991

** Average number of employees*

The 400 small-business owners are from a variety of sectors. Figure 2 clearly indicates that not only differences in the skills of small-business owners but also differences between economic sectors are important in explaining the training policy and training practices in SMEs. There is evidence that the following factors in particular play an important role at sector level (Warmerdam & Van den Tillaart, 1997):

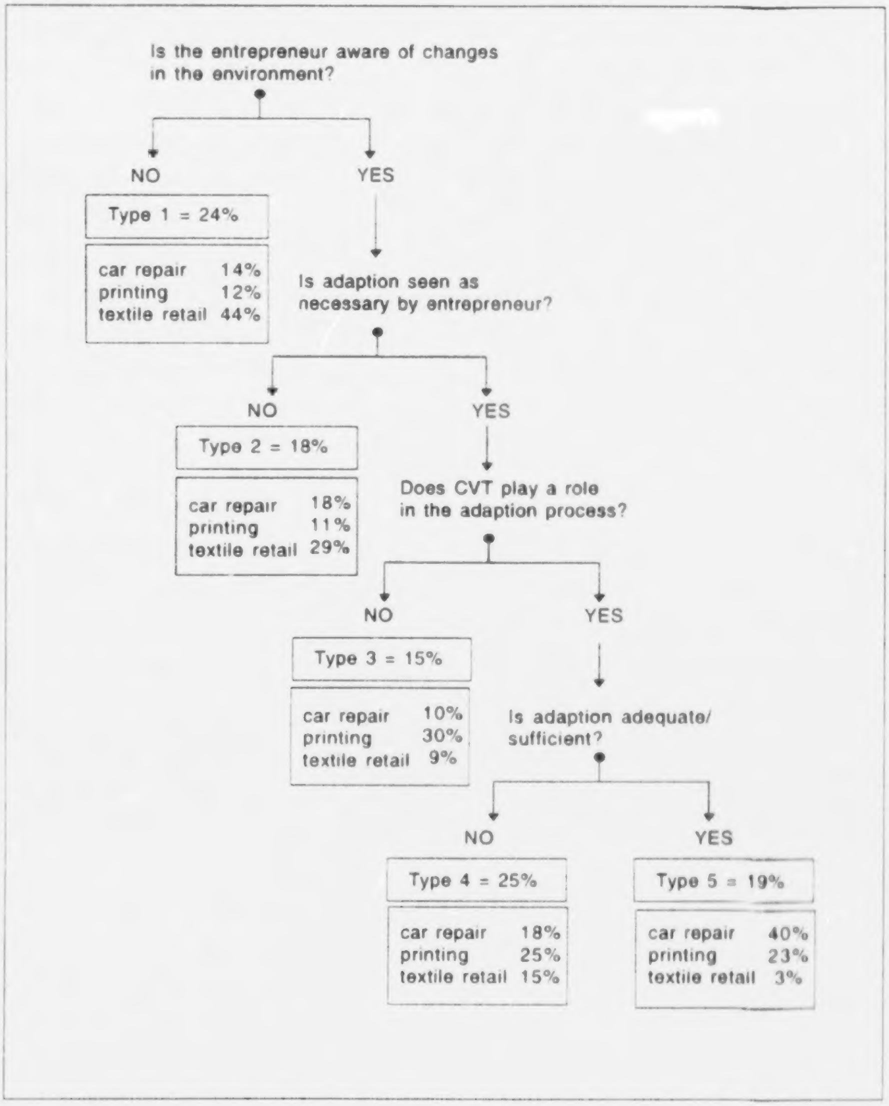
- the dynamics of the sector (for instance: technological developments);
- the homogeneity/heterogeneity of companies, products and production processes in the sector;

- training traditions and training provisions in the sector.

As figure 2 shows, participation in continuing vocational training is relatively high in small car-repair and printing firms and relatively low in the textile retail trade. Car-repair and printing firms face many technological changes. Moreover, these sectors are relatively homogeneous. Training agreements have been concluded as part of the Collective Labour Agreement and the sector possesses a training fund. In addition, there are excellent training provisions. Small-business owners in the retail textile trade face different conditions. Of course, technological developments also take place in this sector, but they have more of an impact on back-office employees than on front-office employees. Besides, there is no training tradition in this sector. There are training provisions at the intermediate level, for instance in the voluntary chain formula, wholesalers sometimes offer training provisions to their retail members, but in 1990 this still was rather exceptional.

As figure 2 shows, in 1991 about half (48%) of the small-business owners in the printing sector used continuing vocational training as a tool in the adaptation process. This is a high proportion compared with the textile retail trade, but at the same time it illustrates that in 1991 there was little or no participation in CVT in 52% of the Dutch printing firms.

Figure 2: ***Adaption and continuing vocational training in Dutch SMEs in the car-repair sector, the printing sector and the textile retail sector****


Is the entrepreneur aware of changes in the environment?
NO
YES
Type 1 = 24%
car repair 14%
printing 12%
textile retail 44%
Is adaption seen as necessary by entrepreneur?
NO
YES
Type 2 = 18%
car repair 18%
printing 11%
textile retail 29%
Does CVT play a role in the adaption process?
NO
YES
Type 3 = 15%
car repair 10%
printing 30%
textile retail 9%
Is adaption adequate/ sufficient?
NO
YES
Type 4 = 25%
car repair 18%
printing 25%
textile retail 15%
Type 5 = 19%
car repair 40%
printing 23%
textile retail 3%

Source H. van den Tillaart, J. Frietman and J. van den Berg, 1991

** In total in this research small firms in eight sectors were involved.*

In this figure we present the results for three of the eight sectors

In most research studies attention is focused on the enterprises where training plays a role in the adaptation process because this category of small enterprises is very important for policy-making; in such enterprises we can observe the factors and mechanisms responsible for this form of adaptation through training as well as the methods used in the adaptation process. This research has demonstrated that in many of these small companies training takes place in both formal and informal ways. Informal types of qualification development, like learning from doing and learning from colleagues within teams, are often located on the job, within workplaces. Opportunities to such qualifications development are related to the structure of work and developments in the work organization.

That is why this CEDEFOP project also focuses attention on this category of small enterprises and on 'training' in a broad sense, i.e. including the more informal learning activities in the workplace. The selection of participating enterprises is also directed to this type of small enterprises.

Central aspects of the problem

Management more important than entrepreneurship

This study into the printing sector focused on the interactive process of change in the organization of work in small printing enterprises on the one hand and the vocational qualifications required and training methods used in the enterprises on the other hand. Thus, internal management processes and the development and use of craftsmanship in micro-enterprises in the printing sector are emphasized more than entrepreneurship. Those aspects of management and qualification seem to be more relevant to the position of the micro printing shops than the entrepreneurship of the owner. The latter aspect was dominant in the retail sector, but in the printing sector a company's potential to follow technological developments, the quality of the service it provides and the cost of that service are probably the most important factors in maintaining the company's position on the printing market. The qualifications of owners/entrepreneurs and their staff are crucial for meeting the technological challenge and achieving and maintaining high quality and low costs.

This does not mean, however, that the entrepreneurship of the owner is not relevant. Entrepreneurship is decisive for the enterprise's market position. In turn, the choice of services to offer and clients to service (the choice of product-market combination) is strongly related to aspects of management, to the organization of work and to the craftsmanship required in the enterprise. For this reason attention is also paid to entrepreneurship but, as we have already said, emphasis is laid upon organization and craftsmanship in micro-enterprises.

Technological developments, product innovation and quality

In the printing industry, technological developments have a strong influence on product innovation, product range and product quality. This is the case in particular in the pre-press and press stages of the total production process and in the enterprises specializing in pre-press work and press work. The electronic devices (hardware and software) used in these stages of the printing process are changing rapidly. Qualifications therefore have to be constantly adapted to use this facilities. So the central questions are: Which technological developments confront micro print firms? How are those developments implemented in these enterprises? How are the available qualifications of the entire staff more or less constantly adapted?

Besides those technological developments, over the last decade there have been big changes in the demands of clients (quality, different media, shorter delivery time, etc). The quality of both the product and service is increasingly becoming the crucial competitive factor. To meet these quality demands the available human capital, the organization of work, the motivation and qualifications of staff are becoming increasingly important in maintaining market position.

So in this project will focus especially on changes in work organization as a reaction to technological and quality demands and on training needs and training methods in relation to changing work organization. Special attention will be given to the question whether firms are aware of the importance of creating learning possibilities when shaping a new work organization.

Formal and informal learning

Besides initial vocational education and continuing vocational training, other forms of learning are probably playing an important role in the permanent process of keeping the available qualifications of staff up to date. Earlier research in small enterprises however has shown that learning processes in small organizations are organized in a different manner and that informal or incidental learning is playing a more important role. Unlike formal training, this informal learning is not structured by some kind of 'pedagogical authority', but primarily by the structure of work and the context of the work organization.

In a certain sense, the term 'informal learning', which is the one most often used in this context, is misleading and we prefer to use the term 'incidental learning'. Unlike formal learning, informal/incidental learning is not an organized form of learning as a reaction to a structural change or need; rather it is learning by using the ad hoc possibilities within normal daily work. So incidental learning is or should be a normal part of daily work both in relation to this work and in relation to the position of the worker different methods and means can be used in this type of learning. Examples are:

- using manuals, etc. for solving a problem;
- practising on new equipment and/or software;
- asking help from a more experienced colleague or a boss;
- using computer instructions or help-functions;
- getting instructions from suppliers, etc.;
- doing difficult tasks under supervision;
- exchanging work experiences with colleagues;
- visiting fairs, shows, etc.

One could assume that more emphasis is being placed on these methods of incidental learning in those small enterprises where formal training is less available and where financial and/or organizational/managerial problems are interfering with participation in formal training (see figure 1).

Learning in networks

It is obvious that printing enterprises, probably more than other small enterprises, are usually part of a network of different organizations, such as other specialized enterprises in the printing process, suppliers of materials (paper, ink, etc), suppliers of machines (hardware) and of programs (software), clients, but also branch organizations (employers', employees' organizations, education and training institutions, etc.). The organizations in this network often play a role in one way or another in the learning processes of the small enterprise. Small printing enterprises are compensating for some of the limited capacities and possibilities of small enterprises through active participation in a network. So in this research there should be explicit attention to the network in which the enterprise is participating and to the role of this network in the organization and qualification processes within small printing enterprise.

Main questions

If we summarize the above, the main questions of this research project will be:

- which (technological and organizational) developments confront small printing enterprises and how are these enterprises adapting to these changes?
- in which specific way are work organization and learning processes and learning methods in small printing enterprises related?
- which training and learning methods are used and how are formal and informal/incidental learning related?
- what are the different learning potentials of these different methods?
- which categories of employees are participating in which methods of training and learning?
- what role are external and internal networks playing in training and learning processes?

Methodology: case-studies in four countries

For this project the case-study methodology is used because it can provide a good description of the characteristics of the different processes of organization and qualification in this type of micro-enterprise and of the factors that are influencing these processes.

The study in printing enterprises involved case-studies in four different EC countries: Ireland, Finland, The Netherlands and Spain. In each country four case-studies were carried out in different types of enterprises.

Interviews and questionnaires

The case-studies gathered data at the level of the owner/entrepreneur and at the level of the staff.

To ensure that the different case-studies in the four participating countries were comparable, the owner/entrepreneur was questioned using a list of topics that was used in all the case-studies. The subjects on this list were, for example, the characteristics of the enterprise (history, recent developments, personnel), the qualifications of the entrepreneur, work organization, personnel management, education and training, workplace-learning and the external and internal networks in which the enterprise participates.

The staff was questioned using a structured questionnaire. Every workshop employee was asked to fill in this questionnaire, which included questions on age, education, labour-market activities, duties, training activities during last years and workplace-learning activities.

Along with these four case-studies it was necessary to give a short description of the characteristics of the graphics sector in the participating country. The description included:

- characteristics of sector/firms (numbers of firms/size/type, employment, professions and developments);
- sectoral institutions (employers'/employees' organizations, level of organization of employers and employees);
- labour relations, collective labour agreements and educational and training aspects in those agreements;
- educational and training institutions;
- participation in education and training, especial in small firms.

Criteria for the selection of cases

For the selection of the cases in the different countries two criteria were central:

- pre-press versus press enterprises. As said before, the whole printing process can be divided into pre-press, press and after-press activities. To a large extent the specialization at the sectoral level is along these lines. For this research project the pre-press and press enterprises are most relevant because in these processes/enterprises the more typical graphical work is done and the more typical graphical professions are practised. So the selection of cases should focused on pre-press and press enterprises;
- shop size of less than five employees and between five and ten.

The four case-studies were not selected at random; the selection was directed towards enterprises confronted with developments and active in one way or another in adapting their staff through training and learning. It is only in those micro-enterprises that the main questions of this research can be studied.

In each country four case-studies were carried out. They were selected in such a way that they included a pre-press enterprise with fewer than five employees and one with more than five employees as well as a press enterprise with fewer than five employees and one with more than five employees. Only micro-enterprises with, besides the owner and his family, at least one employee were selected.

In total 17 micro printing firms were studied. The size of these firms, measured by the number of persons active in the enterprise - i.e. including owner, family members and employees - varied from 3 to 10 (see figure 3). In Finland 5 cases were studied because in one of the firms the employees did not answer the questionnaires. When they did answer later on another case had already been selected.

Figure 3: Some characteristics of the 17 printing firms studied

Country	Case No	Most important activity	Number of employees	typology of strategy
Ireland	1	digital printing	4	Centre
	2	press	10	forward
	3	pre-press/press	8	midfield
	4	pre-press	6	forward
Finland	1	press	10	defence
	2	pre-press/press/after press	7	defence
	3	pre-press	7	defence
	4	press/after-press	4	defence
	5	pre-press/press	8	midfield
Netherlands	1	pre-press/press	10	forward
	2	pre-press	6 (15)[1]	centre
	3	press	10	midfield
	4	press	5	defence
Spain	1	press	3	defence
	2	pre-press	7[2]	forward
	3	press	5	midfield
	4	pre-press	7	forward

[1] *6 in studied location; 9 employees in two other locations.*

[2] *Cooperative: 6 members and 1 employee.*

In figure 3 the result of the selection of cases is presented. It is clear that more firms with 6-10 employees are studied (12) than firms with 1-5 employees (5).

In the project 5 pre-press firms participated, 7 press firms and 5 with a mix of activities (3 pre-press, 1 press/after-press and 1 pre-press/press/after-press). Given the goal of the selection, this is a good representation of the different types of micro printing firms.

Typology of strategy

Reading and analysing the cases it may be concluded that the differences between them have less to do with the country-specific situation and more to do with size of the firm. Relevant differences are related to the main activities of the firm (that means pre-press, press or a combination), the technological developments specific to the pre-press and press firms, the competitive situation in which the firms have to operate and the way in which the entrepreneur is reacting and adapting his firm. The central differentiating factor in the cases studied is the way in which the firms operate strategically. Schumpeter sees two types of firms in this regard: the dynamic and non-dynamic firm. On the basis of the empirical data in this project, we have discerned a more detailed typology. We have used the different position of a football team to describe the types we have discerned in the case-studies: firms playing in defence, midfield firms, forward-playing firms and centre firms.

We will explain this typology in more detail below. In the last column of figure 3 we give the scores from the cases on this typology. As can be seen here, all the various types are present in all the countries, except Finland. In Finland more firms in defence are studied. This certainly has to do with the fact that the Finnish case-studies tend to be situated in smaller cities/villages with smaller print-markets. The financial strength of these firms is mostly limited. They are unable to invest in expensive new technologies, which they generally do not need to maintain their position in their current markets. These firms are vulnerable to competition from outside.

According to the information of the Finnish researchers, there are certainly more dynamic small firms, but if they are successful they often grow (to over 10 employees) or are taken over by other firms. So in Finland a large proportion of micro printing firms (and as we will show in the next paragraph, a relatively large proportion of all Finnish printing firms are micro-firms), are in difficult position, in other words they are 'defenders'.

Figure 4: The relation between main activities of the firm and firm-dynamics of the 17 studied firms

Main activity type	Firms in defence	Midfield	Forward	Centre
pre-press	1	-	3	1
press	3	2	1	1[1]
mixed pre/press/press	1	2	1	-
other	1	-	-	-
Total	6	4	5	2

[1] *This concerns a digital print-shop*

It is clear from figure 4 that the pre-press firms are more dynamic and the press firms less so. One of the press firms is very dynamic (centre), but this is a very special case. This Irish firm is in fact a shop offering digital printing services to its clients as one of its services. It is a computer shop selling advanced and specialized computers (hardware and software) for graphical purposes. It is thus not a traditional printing firm branching out into digital printing but sees digital printing as a logical extension to its computer activities.

Among the mixed firms, the situation is also mainly 'mixed'. The press activities are mostly stable and the pre-press activities are developing. While there is a certain dynamism among these firms it is mainly in the pre-press part of the firms.

The concentration of developments/dynamism in pre-press firms/activities is undoubtedly related to technological developments in the printing industry. Offset technology is used almost exclusively in small press firms and this technology has existed for only about 25 years and has in principle not changed much. This based water-ink technology has of course been refined and improved and presses are faster etc. The machine-processing of these presses has recently been computerized (changing plates, inking, etc.) which has resulted in more efficient machines and higher capacities. But it is not surprising that small print-shops are very careful about investing in this new technology. Most of them cannot expand their markets to enable them to make their high investments profitable (these machines are very expensive).

In the case-studies carried out in the four countries participating in this project none of the print-shops had this new generation of presses and most of the entrepreneurs took a wait-and-see attitude towards this technology.

However, in pre-press technology, changes are happening fast in all the different stages of the process and in the equipment used. Firms in this sector must at least keep pace with innovations or risk losing clients and/or markets. In addition to 'normal' rapid changes in computer capacity and possibilities and 'normal' rapid updating and changes in software, there are three very important developments which should be mentioned: multi-media, etc. (i.e.-information format is not paper but electronic media), computer-to-plate technology and digital printing.

At the moment information that was traditionally communicated on paper is increasingly communicated by electronic media (CD-ROM and the Internet). It is clear that part of the traditional graphical market will be swallowed up by these electronic media. But pre-press firms which are qualified in the management/manipulation of electronic data are certainly qualified to operate in this new market. In this case, new qualifications are needed (electronics, system management). In the case of the new digital printing technology, the situation is probably the same. The whole pre-press process stays the same; only the printing is new. At the moment digital printing is only competitive for smaller printruns (not film and plate making) but this technology is developing fast.

Computer-to-plate technology perhaps interferes least in the normal printing process, but the traditional way of film and plate making will have consequences especially for small firms. Investment in computer-to-plate equipment is expensive and the question is whether small firms can afford this equipment. The situation is the same as for the newest offset technology. In general one can observe the same reaction from entrepreneurs in small firms: wait and see if, how and when it will have consequences for me.

Structure of the synthesis report

From reading and analysing the case-studies it is clear that in the printing industry differences can be observed between the dynamics of firms. Related to this, work organization and training and learning strategies and practices are also different. So in this report we will not describe all the cases but will provide a good example of every type.

Consequently, in chapter 3 we will present four cases:

- a *small Finnish press* firm in a *'defence' position*;
- a *small Spanish press* firm in a *'midfield' position;*
- a *Irish pre-press* firm with 6 employees in a *'forward' position;*
- a *Dutch pre-press* firm with 6 employees in a *'centre' position*

But first in chapter two we will briefly present some relevant characteristics of the printing industry in the four countries involved in this project.

In the final chapter, chapter four, we will show and analyse the outcomes of the study concerning the training and learning activities in all the cases studied and in this chapter we will also summarize the outcomes of this study and formulate our conclusions.

2. SOME CHARACTERISTICS OF THE PRINTING INDUSTRY IN THE FOUR PARTICIPATING COUNTRIES

The position of micro-enterprise

The total number of printing firms in the different countries varies of course according to the size of the national economies, exports, etc. It is not surprising that Spain has the highest number of printing firms and the highest employment (wage earners) in its printing industry.

In Ireland the total number of firms is rather low. But if we look at employment and the mean employment per firm in the different countries, the differences are remarkable. The mean number of workers is Ireland is high compared with The Netherlands and Finland. In Spain the mean number per firm is also rather high, but in Spain there are a great number of firms with no wage-earners and this type of firm is not included in the number of firms presented in figure 5.

The number of micro-firms is especially high in Finland (85% of the total) and low in Ireland (15%), as already reflected in the figures for the mean number of employees per firm. In Finland printing firms are probably spread over the whole country with no clear concentration in a single urban area, as is the case in Ireland. In Ireland the printing industry is not only highly concentrated in the Dublin area, but the printing of computer/software manuals was a very important market (figures for Ireland are from 1993). This market was served mainly by bigger companies but this market is at present rapidly becoming less important because computer manuals are increasingly being put on CD-ROM. This fact has sharpened competition in Ireland because firms are looking at alternatives in the colour market.

Figure 5 also shows that, in so far as comparable figures are available, press firms and employment in press firms are far more important than pre-press and after-press. In The Netherlands the number of firms in press and after-press firms is diminishing.

Employment, however, is diminishing in all firms. In Finland the situation is more or less the same, although employment in the after-press segment is growing. For Ireland and Spain comparable figures are not available but in Ireland employment in general is certainly diminishing.

Figure 5: Printing industry: sectoral characteristics

	Netherlands 1996			Finland 1996			Ireland 1993		Spain	
	abs.	**%**	**Trend**	**abs.**	**%**	**Trend**	**abs.**	**%**	**abs.**	**%**
Total number of firms	3 700		-	2 500		?	622		6 503	+
Total of workers	51 200		-	27 842		-	18 563		131 300	
Mean workers per firm	14			11			30		18	
Number of micro's (-10)	2 430	66 %	+	2 145	86 %	±	281	45 %		
Number of workers in micro's	8 300	16 %	+	2 521	9 %	-	?			
Most important activity										
- pre-press firms	370	10 %	-				85	14 %		9 %
- pre-press workers	3 580	7 %	-	949	4 %	-	819	4 %		
- press firms	2 890	78 %	±				281	45 %		71 %
- press workers	40 960	80 %	-	25 623	95 %	-	6 540	35 %		
- after-press firms	220	6 %	±							6 %
- after-press workers	4 100	8 %	-	440	2 %	+	907	5 %		

In summary, it is clear that micro-enterprises in the printing industry in the four countries are an important part of the total sector. Although the economic situation following the downturn in all countries in the early nineties has improved, it has not resulted in an improvement in employment. On the contrary. In The Netherlands micro-enterprises seem to have strengthened their position vis-à-vis the bigger firms. This does not seem to be the case in the other countries, especially Ireland where the smaller firms face strong competition from the computer-manual printers who are losing their market to the new media. In Finland there is a very high proportion of micro-enterprises in the printing sector. They find it difficult to innovate owing to the high costs of investing in new technologies. This is also illustrated in the Finnish case-studies where nearly all enterprises have limited financial resources.

So the position of small printing firms seems under pressure in the countries in this study. The new 'digital printing' technology is also a threat because it is competing specifically with the fast turnaround low-volume colour printing market, the market where many small printing firms are active.

In Ireland 'instant printing enterprises' are rapidly expanding. These firms and entrepreneurs do not have a traditional graphical background and they are developing outside the printing sector and its institutions/regulations. For these firms flexibility and creativity are more important than traditional graphical qualifications. In Ireland pre-press firms are thus moving out of the sector. An example of this development is the first Irish case-study of a digital print-shop which started off as a shop selling specialized computer equipment. In this light it is remarkable that small firms in The Netherlands are strengthening their position in terms of numbers of firms as well as numbers of workers.

Labour relations and labour-market

Labour relations in The Netherlands, Ireland and Finland have much in common. In The Netherlands a closed shop existed until recently. The degree of worker organization (> 90%) illustrates this point. Although in Ireland one cannot formally speak of a closed shop, the fact that 90% of the employees belong to a union shows that in reality the system has all the characteristics of a closed shop. In Spain the printing trade unions have played an important role in the history of trade unions in general. During the last decade the unions have lost importance. In small and micro-enterprises very few workers belong to trade unions.

In Finland union membership is very high (for the whole country 87%, for the graphical industry even higher). In the graphical industry employees are organized in different unions belonging to various central organizations.

In Ireland the collective labour agreement is concluded at the central level between employers' and employees' organizations. In The Netherlands the new CAO on the central level is only a framework of minimal regulations while at the branch and/or firm level more detailed negotiations can take place. This policy, which is new for the Dutch printing sector, corresponds to the labour relations situation in Finland.

As a result of the closed shop system, and the strict associated labour-market regulation, the labour-market in these countries is structured and controlled to varying degrees.

As a result, the vocational structure (and labour-market) in the printing industry is clearly structured and regulated. In most firms, including the cases studied in the different countries, this vocational structure is clearly recognizable, especially in the press firms and the mixed pre-press, press and after press firms. Internal flexibility for example is largely restricted due to the clear professional and functional structure.

In Ireland and The Netherlands the social partners are jointly responsible with the government for education and training in the printing sector.

An important change has taken place in recent years in Dutch education and training in the printing sector. The apprenticeship system is losing its position in vocational education while day-time education at the graphical *lycea* (5 in total) is expanding. The number of apprentices in the dual system for example fell between 1992, when there was a total of 2786 apprentices, and 1996, when there was a total of 941 apprentices Over the same period the number of day-time pupils in the graphical lycea grew from 4500 to 5740. The pre-press firms are certainly taking on more new staff with MBO or HBO qualifications instead of educating pupils themselves. This partly has to do with the fact that in modern pre-press firms it is becoming increasingly difficult to supervise pupils. The demand for new staff in press firms is low because the bigger companies are rationalizing and achieving greater efficiency through technological innovations and the smaller press firms are taking a wait-and-see attitude.

In Ireland the number of apprentices entering the printing industry annually is regulated by agreement between employers, trade unions and the FAS (government board for vocational education and the labour-market). Here the intake of new apprentices is also falling. Less employment in some segments (for example in the printing of computer manuals) and new technologies in the pre-press sector are playing an important role. In Ireland there is also a trend for new pre-press firms to move out of the printing industry. These enterprises have no tradition in the printing industry and they do not want to employ traditional qualified graphical staff (and union members); they prefer young computer-literate people with flexible and creative minds. In The Netherlands the same trend appears to be taking place.

In Finland the number of apprentices in the apprenticeship system fell sharply between 1990 and 1993 from 123 apprentices to 19 in 1993. After 1993 the number of apprentices rose again in 1997 to the 1990 level of 118. 360 pupils are following graphical courses in full-time vocational education.

Although the provision of training is good in all countries (in The Netherlands the sectoral training organization offers 163 different courses), participation in the courses is limited. In Spain for example the new CVT system (founded in 1993) is growing but participation, especially in small and micro-enterprises, is low. This is again confirmed in the firms studied in this project.

3. THE FOUR CASE-STUDIES

3.1 A defence player: a small press firm in Finland

Special characteristics and entrepreneurial aspects of the company

Establishment of the company

This company was established in 1980. The company was established by the husband of the present managing director, who is now running the business. She came into the company in 1989 and was officially appointed managing director in 1992. The reason for this was simple. The owner decided to set up a new company. This new company was established in Rovaniemi (which is situated in the north of Finland). There was therefore a need for a good manager for the first company. The present managing director took over the responsibility of running the new company.

The two companies are managed separately, which does not prevent them from cooperating on specific rare occasions. Those rare occasions involve business not education. The two companies also established a subsidiary for exporting printing goods and services to Russia, especially to the Murmansk area. The subsidiary was actually part of the company that was established in Rovaniemi. In 1996 the subsidiary was closed because of a fall-off in business in that area.

Management and the personnel of the company

Since the company was founded by an 'insider' to the branch, the managing director of the company was obviously very experienced in the graphic arts industry. The managing director is a university-educated woman, who decided to enter printing business.

A the time the decision was made the owner of the company was sure that his wife had sufficient experience in the printing industry and handed over the management to her.

It is therefore quite natural for the director to take care of the overall vision, and planning. She can also perform most of the tasks in the company if necessary. What is interesting in this company is a certain kind of duality in management. In 1996 the managing director recruited a new director for the company. This new director - printing house director - also has an academic education and looks after some of the same tasks as the managing director.

The rest of the personnel (3 at the moment) of the company specialize in the specific printing functions of the company.

Production and production technology

The company's main functions are printing and press-related activities (binding, etc.) which are more or less equally important for the company and are developed in parallel with each other. There are also pre-press activities in this firm.

As is almost normal procedure in this busy and competitive market, this is a company which is trying to make money with various print-related activities. Printing of coloured newsletters, small books, comics, cards, business cards for different organizations, brochures and company forms are the main products of the company.

The management of the company is trying to cope with the changing market by emphasizing the high degree of motivation of its staff through a very democratic and, as they put it, 'human' approach to management.

Customers and networks, contacts to other companies in the branch

The company has about 150 customers. They are situated mainly in the area around Tampere and their relationship with the company is mostly well established.

The customers can be divided in two groups according to the frequency of their purchases. The most active group of customers buys quite regularly and the less active group buys only once or twice a year. The number of active customers is about 80. The amount of each business transaction is quite small - even for the active customers. For the company it is important that these customers buy regularly.

The management is not actively seeking out new customers because the present ones can be serviced optimally with the existing personnel.

Financial aspects and investments

Financially there are major problems. This is due to the decision taken a few years ago that the success of the business should be based on the expertise of the staff. This meant that there have not been any major investments in the company in recent years.

That decision was taken at that time because the managing director wanted to prevent the company from having over-capacity. It was good decision at that time according to the management, but now there is a need for investment again. Machines are too old for a profitable and productive business.

The technology available in the company is still functional and is strongly supported by the expertise of the personnel. Nevertheless there is an urgent need to renew at least some of the machines. There is also a need to replace some of the oldest printing machines and increase capacity in offset printing.

This company is also confronted with serious questions regarding the strengths and weaknesses of digital printing and its effects on the traditional printing business. Many decisions - in this printing house too - are dependent on the basic decision whether to continue printing the traditional way or to go over to digital printing.

The management of the printing house has a bad conscience about the lack of investment in the most essential business strength in the longer run, i.e. in improving the skills and competencies of its staff. There has been no major investments in this area during the last few years.

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Recent important developments and reactions

Sales

Sales are the responsibility of the managing director of the printing house. The sales activities are concentrated on nurturing personal relationships (or networks) and finishing simultaneously the business with them. Much of the business is based on longer term agreements. These so-called annual agreements are negotiated once a year, and business is taken care of on the basis of the terms and conditions stipulated in them. The business relationship is kept alive and active during regular visits and business meetings with customers.

'We know that we are doing quite well, but there are also some unfair business players out there. Just to give an example: the local university here has its own press for printing certain items for university purposes. But these are not so many items that they can run their business at full capacity. Because of that they also offer printing services outside the university, and - of course - at lower prices, because their fixed costs are much lower than those who are doing business under market economy conditions (e.g. taxes are lower for the university press and they pay a lower rent on their facilities).

Functional implications, products and services

The managing director and director of the printing house are responsible for the whole business. This also includes pre-press activities, printing and printing related services. There are of course specific tasks for each employee, but in the end the director is responsible for the success or failure of the company.

Some changes and further steps developing the framework of financial resources have taken place in the last few years. One quite important one was the development of secondary responsibilities for the employees for unforeseeable events, i.e. sick leave, increased pressure of work due to large orders.

The main services of the company are printing services and services related to printing (binding, etc.). It has a printing capacity - depending on the colours used and the number of pages - of 1000 to 2000 newsletters in a given time span.

Stronger competition

Competition is the feared word of the day in certain small companies. The ability to compete with others partly depends on the capacity to differentiate. The mode of differentiation used successfully in this company can be called 'the emphasized personal network management' system. This simply means that all the activities with the customers are taken as seriously as business should be taken.

Recent cooperation and networks

There are no formal cooperation procedures or structures, either for education or for production.

'That is an interesting possibility, which will be studied more closely in the near future.'

That quotation is from the director of the printing house, when she was thinking aloud about the future.

The director has made some arrangements with local companies for situations in which one or the other needs some additional production staff for some reason. More exact agreements are needed before they can implement this system.

Future plans

The main future change, i.e. digital printing, will also be the most important issue in years to come for this company. The decisions concerning this should be taken in two years. The major changes are no more than five years aways, according to the analysis of the director of this printing house.

This kind of micro-enterprise with limited resources is not able to develop all the crucial aspects of its business operations at the same time. They should therefore concentrate on the more important areas.

It is also acknowledged in the company that there is still a great need for printing expertise and specialists and also in all printing-related activities. Training and personnel development will be one of the core activities (along with the business activities) in the short term.

Managing micro company in a turbulent and changing environment

Competition and competitive advantage

The company's markets are defined both by the geographic area surrounding the company and by the products. Some of the products printed in this company are special. There are groups of customers which like to have their products printed in a printing house that understands and appreciates their work; for example the publishers of underground comics, etc.

A more business-oriented approach is used for the printing works done for the University of Tampere, such as doctoral dissertations and small newspapers and newsletters for official organizations and certain private sector organizations.

The competition that will have some effects on this company comes mainly from the Tampere area and from bigger printing houses which use price as a mean of competition. Usually these printing houses reduce prices for smaller printing job - which are for them quite marginal - but which mainly hurt the small printing houses.

Company structure, number of employees and business implications

The company has a clear and simple structure. On the first management level, the managing director is responsible for marketing, strategic planning and sales. The director of the printing house is responsible for the price-setting, transportation, accounting and production.

The second level is the production level: pre-press (1 employee), press (1.5 employee) and press services (0.5 employee).

For each of the functions there are experts, who have been educated and trained for their particular function. The employees are on the production side, i.e. prepress, press and press related activities. The number of employees is 5. The managing director of the printing house put it this way:

'There are five employees, and I am one of them.'

Management of company, networks and cooperation

The management has handed over many of the responsibilities to the employees. This is because of her philosophy about human nature. She believes that giving responsibility is the best way to motivate people and to assure that they are doing their best for the company.

A common practice in the company - which supports the director's message - is that there is no formal scanning system in the company which the director has to assess now and then. The procedure is simpler. There is only open communication which is used when the director is participating in the decision-making processes in which all employees are almost always included.

Certain networks are rarely used. The most often used form of networking is business meetings (lunches, etc.) during which some discussions take place about the branch in general, about developments in technology, etc.

Cooperation - production-related, or educational - is the same; it rarely takes place in this company.

Amount of work/working hours and nature of employment (employment relationship)

This company follows normal working hours: Monday to Friday, from about 8 am to 5 pm. There is no need to work overtime, at least not at the moment. Everything can be done during the normal working hours and on week days.

All employees are permanent in terms of the employment relationship.

Organization of business activities

Recruitment and selection of personnel

New staff has not been recruited since the early 1990s. There is one exception: the director of the printing house. Because there is so little need to hire new employees, no formal system has been developed for the purpose.

When there is a need for a new employee(s), the situation is first closely analysed by the director. The second step is to call all the colleagues in the branch to find possible candidates for the new position. Both old and new contacts are utilized in order to find someone who could meet the requirements of the new job. Standard interviews and tests are usually required, but references received from people in the branch are more important.

Professional qualifications in the field of printing are the most essential selection criterion used in this company. New employees also need a background that is well suited to the existing organizational culture of the company. At least some knowledge of business thinking is also desirable as well as an ability to take care of business as a whole.

Internal working conditions

The director described the company's internal working conditions as very good. Questions put to passing employees provided strong confirmation of that view. The main reason for this satisfaction is that a short review meeting always held on Friday afternoons, at which all employees can raise the positive and negative aspects and events of the week. Those reviews also lead to required and suggested action shortly after the problems have been identified.

Managing change

There is a need for change management. Change management is just one part of the variety of tasks of the director. Some problems are faced when there should be judgements about the direction and timing of that management. There are good opportunities for a company with new approaches in the printing business. Nearly all those opportunities need heavy investment if they are to be grasped.

In particular decisions about digital printing as against traditional high-quality niche printing are waiting to be taken. So far there have not been any compelling reasons to take those decisions, though the need and urgency are acknowledged by the director and her employees. It could also be said that change management takes place more or less collectively in this company, with the involvement of all members of the company.

Organizational functions; processing of orders, contacts with customers

The company is divided into only two different levels. There is the management level, which includes the director and her assistant. Then there is the production level. In this company - as emphasized by the manager - there is actually no division between employer and employees.

The organizational functions such as marketing, order processing, production, etc. are also reflected in the structure of this company. Historically all those functions have been the responsibility of the director, but since the company is concentrating on certain products which need more commitment from the director, they are at least partly dealt with by her assistant. Customer contacts are dealt with by the managing director and the director of the printing house.

Short-term plans, i.e. plans for a week or two weeks, are usually made by the director. Long-term plans are drawn up only when there are some strategic decisions to be made and it is done with cooperation of the personnel.

Production is organized daily, based on the workflow. There are also weekly plans for production, which are readjusted daily.

There are no special procedures for receiving orders. Usually orders are processed as follows: customers deliver their orders - by telephone, fax, letter, etc - to the company and then the orders are confirmed. Regular customers use the fastest mean of communication, such as e-mail.

Now and then there are special aspects of jobs that need to be taken care of. In such cases there is slightly more communication to ensure that the customer's needs are known and to avoid any problems.

Finished jobs are usually delivered to customers using bought in transport services. This is the cheapest and safest way to take care of this service.

Invoicing is a management task and is carried out using a computerized system.

Customer feedback is analysed weekly at the Friday afternoon meetings. The director chairs the meetings and the employees give their explanations and reasons for the discussions during which it is decided what can be done about the complaints and how their numbers can be reduced. Customers are always informed about the results of the discussions.

Education and training

Past

Education and training have always been an important issue in this company. There have been some attempts made in the past to improve the skills and knowledge of employees and management, i.e. the manager. Those attempts were based mainly on the 'learning by doing' and 'in-house learning' methods, because of the high cost of education and difficulties in arranging replacements for employees on courses.

There was little need for basic vocational training in the past, because all employees in the organization already had a high level of skills and knowledge when they entered the company.

Present

Three staff members have received vocational education, and two a higher education.

Three staff members have followed a course: PageMaker and Corel Draw, management and marketing/export.

Apart from courses, it is also possible to learn at and through one's own work. The methods used illustrate that the employees in this firm are operating rather autonomously. This probably has to do with their vocational qualifications and their long experience in printing and in this firm.

The most important methods mentioned are (common /occasional):

- learning by solving problems by yourself (4)
- learning by solving problems together with colleagues (4)
- learning by using handbooks, manuals, etc. (3)
- learning by involvement in management, planning, etc. (2).

The first two methods mentioned here are also the methods with the most important learning effects according to the answers of the employees to the questionnaires.

Given the qualifications of the employees and the limited developments that have occurred in this firm, it is understandable that other methods of learning are not common and are less relevant to the functioning of this firm at this moment.

Future

In future there will be major changes which will all affect the activities of the company. The director of the company emphasized that there is no other way of coping with the changes except to increase dramatically the development of employee education and training. Most essential will be the development of the branch, which is determined by the development of technology and customer needs.

3.2 A midfielder: a small Spanish press firm

Characteristics of the firm and business-related aspects

Foundation, location and activities

The firm, located in an industrial development area in the outskirts of Barcelona, is a private limited company, founded by two of the present five partners as a corporation in 1989. For legal reasons the firm's status was later changed to that of a private limited company. The two oldest partners founded the company after being made redundant. They asked to receive the total sum of the unemployment allowances they were entitled to in a single instalment and they raised a mortgage on their own property to invest in purchasing equipment and starting up the business.

In the early stages - for about one and a half years - the two founder members worked for less than the going rate for their jobs. For the first year they did not pay themselves any wages at all and lived on family allowances. In the second year, when the business was starting to do well they paid themselves low wages, which they gradually increased as the firm progressed, until they reached the wage rate for their occupational category.

The company prints in any format. It prints mainly catalogues, leaflets and company promotional brochures and also designs and produces special brochures with a high graphic arts content. Although its main activity is printing, it is also involved in the production of graphic arts brochures from design to composition.

The manager

The manager is not a manager in the traditional sense, that is to say, he is not the sole owner of the business, but the person in charge of the administrative and commercial tasks in the firm, in which several partners also work. However, his professional career and involvement in founding the firm reveal his entrepreneurial nature, which explains his need and desire to embark on economic adventures and search for new activities.

He started work at 16: first, he learned the printer's trade; then, he was self-employed in various jobs such farming and retailing, and finally he returned to the printing trade. He has no vocational training certificate; everything he has learned he learned through work experience. In some way, he can be considered as a self-made man on a small scale.

The staff

The firm employs five people including the administrator. Four of them are registered with the social security and one - the administrator - is self-employed (for legal reasons which do not entitle him to be registered with the social security). Three of the four employees work in the printing process and one in book binding.

Only one out of the five partners is under 40. Except for one of them, they have all worked for the firm since 1989. The fifth employee joined the firm in 1994.

All of them have a broad work experience, which reveals a high degree of professionalism, even if their initial training level is not very high. Only two out of the five employees have an official vocational training certificate - one of them in FP1 (elementary level vocational education) and the other in FP2 (middle level).

Financial situation

Without going into too much detail, the firm's financial and economic situation is sound. Apparently, they have no economic difficulties and are in a good position, which may not enable them to accumulate wealth but permits them to work under good conditions, on wages which are in keeping with their job, and to renew their equipment regularly.

Important developments and manager's reactions

Activities/clients

According to the administrator, the firm does not make specific products, but can carry out or manage any type of printing work. However, the bulk of their activity is devoted to producing catalogues, leaflets and company promotional brochures. On the whole, they do standard, but quality printing, which involves a wide variety of sizes, materials, etc. The firm's activity is limited with regard to size of printruns, but they accept large orders and subcontract to other printing shops which do large printruns.

In addition, the firm also makes special products, such as cardboard boxes containing a surprise, wooden boxes for promoting a product or congratulation boxes or mousepads. In such cases it manages the whole production process of the product ordered by the client, from design to final composition. Managing the process means looking for suppliers for the tasks which the company does not perform, for instance design, through its network of friendly firms. It receives and manages the orders of this production network, by controlling relations between their clients and the network.

There is no one type of client since the company produces or manages the production of any orders, including printed matter. However, the firm's policy is targeted at having regular clients. This has been a successful policy so far because of the quality of the integral service provided. In this context, it is worth noting that they have no salesperson and they do not depend on any intermediaries to find clients. From the early stages in the firm's activity clients have come on their own initiative and they have not had to look for them.

Specialization

It cannot be said that the company has any specialization, as is clear from the above paragraph. The firm undertakes all kinds of printing and management of design presentation, always ensuring the quality of the products delivered.

However, as regards the firm's own activity, that is to say, the printed matter it produces, there is a certain limitation with regard to the printrun size. Such limitations are dictated not so much by technology as by the need to maintain a certain flexibility in order to serve all their regular clients in the shortest possible time. Their printing shop presents certain limitations because it operates with one-colour printing equipment, which means that production times are too long for printed matter in colour in large printruns. Such technological limitations force the firm to subcontract to other firms in the graphic arts sector which have the equipment required for large printruns.

Technological level and technological investment forecasts

When the firm was set up in 1989, the partners purchased new machinery to start up the business. In subsequent years they made regular investments to update their equipment. They have foreseen that they will be able to purchase new machinery every seven years. Such an investment can amount to about 20 million pesetas or ECU 120 000.

The last investment - a very recent one - was in a new printing press: they replaced a Heidelberg printing press with a more advanced machine which has a computer controlled printing process.

Investment strategy is directed towards constant updating, but does not include, in the short-term, the computerization of the whole printing process. The firm's goal is, in any case, to control and manage the process from computer screens. However, they foresee, in the long-term, the computerization of the whole process and the introduction of pre-printing tasks too.

Prospects for the future

Regarding the firm's future, no major changes are planned in the company's position in the printing market. It intends to maintain its regular clients, who give the firm the necessary financial stability. An illustration of such a stable situation is the fact that they do not employ any sales staff and do not consider it necessary in the future.

The administrator did not foresee any growth which could involve increasing the number of staff. He was not eager to join the spiral of growth because this would have side-effects which would radically change the way the firm operated. In other words, he could see very clearly that so far the firm's size had restricted management problems to management of the work done, and that if the business grew the firm's management would face new problems which would not be easily tackled with its present capacity.

Nevertheless, the situation changed in the course of the research. The firm started planning the integration of all pre-printing tasks from design to the production of lithographs. The long-term plan is to introduce technological changes to computerize the whole production process from design to the final printed product. Such a change in attitude is related, on the one hand, to current developments in the sector, which - according to the administrator - are leading up to the integration in one printing shop of all the tasks done in the graphic arts sector; on the other hand, it is at least the administrator's intention to offer his children access to a job, which is another time-related plan to ensure the firm's financial success.

Before considering this change in the concept of a firm in the graphic arts industry, they had planned regular investments, every 5-7 years, in new equipment to keep up to date, that is to say, to continue providing the quality required by their clients. Such logic cannot be maintained if they finally extend the scope of the firm's activities.

Competitiveness strategy

Three interrelated elements have to be considered with regard to quality within the firm's competitiveness strategy. On the one hand, its strategy is oriented towards ensuring the quality of the printed matter itself - that is to say, its main activity - and on the other hand the strategy is related to the service provided to their clients. The latter is essential to ensure its financial success. The firm's activities are limited to printing in the strict sense of the word. It does not want to be left in a position of dependence on other firms in the graphic arts sector (for instance, designers, intermediaries), so it has reversed the situation by providing its clients with an integral service in graphic products which includes the whole production process from design to composition. The third key element in its strategy is seeking regular clients. The firm is only interested in regular clients who offer security in their commercial relations (those which pay invoices and place regular orders) with the firm and in ensuring the quality of the services provided to them.

Summary

This is a typical firm within the sector; it is not limited only to printing activities, but provides its clients with an integral service from design to composition. Therefore, it is not limited to printing a great variety in standard products (catalogues, brochures, etc.), but has also extended its activities to non-standardized products such as cardboard or wooden promotional boxes. The new challenge to the firm is the integration of pre-printing activities to ensure their financial success in the long term.

Within such a context, we cannot speak about specialization dictated by the technology available to the firm, but a certain specialization in products due to the firm's commercial strategy.

Nevertheless, a clear distinction must be made between the firm's general activity and the activity carried out within the firm itself, that is to say, between the services provided and the firm's main activity. Regarding the latter, there is a certain specialization in short and medium-sized printruns. For multicolour printruns over 30 000 copies they subcontract to printing shops specializing in this type of activity. In this case, it can be said that there is specialization for technological reasons.

Although the firm is not using the most advanced printing technology, it has a good technological level. It intends to maintain this level in the future which will enable the firm to provide the quality printing of demanded by its clients at competitive prices. In the near future it intends to include pre-printing tasks, which means investment in suitable technology and, in the long-term, technological change towards the digitalization of the whole process, from design to the final printed matter.

From what has been said so far, it is obvious that the firm's competitiveness strategy is oriented towards quality both in the printed material produced by the firm itself and in the partial and integral services provided at the pace demanded by the market, which is useful for creating ties with its clients. Its relations with its clients are essential. This is the context in which the firm's production networks operate. The design of such networks enables the firm to keep client-network relations under control, although this does not mean a monopoly on such relations.

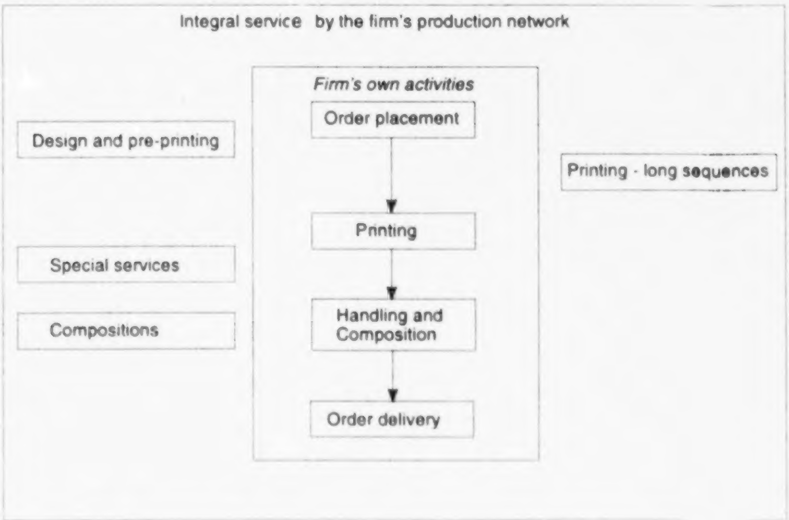
On the whole, the firm is in a good position in the graphic arts market owing to its commercial strategy of providing an integral service. There is not much pressure on it to offer its products at increasingly lower prices.

With regard to the future, its strategy is oriented towards maintaining its position and making regular investment to ensure the quality required at competitive prices. The final goal is to ensure the firm's efficiency at its present size so as to guarantee the partners workers' purchasing power. It is not their objective to grow and obtain an ever larger profit.

Organization of work

Division of work

Figure 5: The division of work


Integral service by the firm's production network
Firm's own activities
Order placement
Printing
Handling and Composition
Order delivery
Design and pre-printing
Special services
Compositions
Printing - long sequences

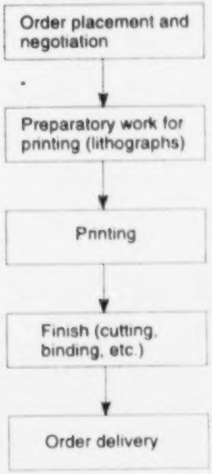
From the above paragraphs it can be inferred that work organization within the firm can be divided into two parts. On the one hand, there is the firm's integral service, which must be conceptualized using the idea of production networks since it is not an exclusive activity of the firm itself: the firm manages the realization of the products by assigning specific tasks to the collaborating firms, which can taken as a whole be considered a network. Figure 5 shows the division of work in this virtual network by distinguishing between the possible activities carried out in the network and the main activities carried out by the firm itself, that is to say the placing of an order, the printing and the delivery of the final product. All the other activities are carried out at the clients' request.

The figure also reveals that the firm is managing the relationship with clients, which does not mean that it is monopolizing those relations. For instance, when design proposals are presented to clients, the designers take part in the meetings. However, the production network is directed by the firm, which controls relations with clients.

Concerning the division of work within the firm, it can be seen that it is marked by the principle of one person per job, which also includes management tasks and dealing with clients, a job done exclusively by the administrator. There is a fitter, two printers and a cutter. In addition, there is one person exclusively devoted to clerical work.

Functioning process

Figure 6: Firm's functioning process (own main activities)


Order placement and negotiation
Preparatory work for printing (lithographs)
Printing
Finish (cutting, binding, etc.)
Order delivery

When referring to the firm's own main activities we can distinguish between the phases shown in figure 6. Each phase of the production process is assigned to an employee, except for order reception and delivery which are dealt with by the administrator. There is no rotation between the different jobs, that is to say, versatility principles are not applied, which would mean hiring an external worker if one of the employees had to be away for a long period. For short periods, some hours or days, the absence of an employee can be covered for by the other workmates, because the professional experience acquired throughout their working lives enables them to handle all the equipment temporarily.

If it is an urgent matter - an employee is away for a short period or problems arise which affect several tasks - such Tayloristic principles are abandoned and they resort to collaboration principles by applying in the first case - absences - the versatile knowledge acquired in the course of their working lives, and in the second case - problems - by resorting to the mechanism of improvement groups as they are known in large firms. The most striking differences between the mechanisms used in micro-enterprises and those used in large enterprises are that:

- The mechanism kicks in naturally and spontaneously in small enterprises, whereas it is much more controlled and formal in large enterprises.
- It usually involves processes among equals which are not formally led by anybody but by a clear objective imposed by the problem. In large enterprises improvement mechanisms are mostly hierarchical and are controlled and directed by management representatives.

Relations with other printing works

The above description reveals that relations with other printing works are very important for the firm because they enable it to maintain its position in the printing market. If we analyse their relations with the other printing shops in depth, we see that it is a sort of virtual network with the firm at the centre, controlling and dominating the information flow within the network, despite the fact - pointed out several times earlier - that it does not monopolize relations with clients.

One of the essential conditions for the creation of such a production network and its continuation is its (regular) clients' trust and supposedly its relations with the other printing shops belonging to the network, which are based on cooperation and not on delegation.

Summary

Regarding the organization of work in the firm, there is a distinction between its main activities and the integral services provided to its clients taking advantage of the production network available.

As for the internal division of work, there is a marked division governed by Tayloristic principles, with a fixed distribution of functions. However, such principles are temporarily abandoned in case of absences for a short period, thus making use of the employees' versatility, and when problems arise which can only be solved using collective mechanisms. This is when on-the-job learning processes are started up.

As regards the division of work in the production network, it should be stressed that - contrary to what we had initially expected - it is the firm under study which controls the communication flow within the network and not the designers or large printing shops. The firm has managed to reverse network-creation processes due to its good links with clients. The latter are mostly regular clients which have not been found by a salesman but which contacted the printing shop themselves and whose trust in its capacity to provide quality services has been confirmed.

Human resources management and training level

Initial training level and professional experience

Only two out of the five employees engaged in printing have a recognized vocational training certificate: one of them in FAL (elementary level) and the other in FP (middle level) as a specialist in graphic arts. All of them have long professional experience acquired in several printing shops. Four of them formerly worked for a firm which went bankrupt before the present firm was set up.

Continuing training

From the interview with the firm's administrator and the answers to the questionnaire, it can be inferred that the firm has never provided continuing training. The professionalism acquired by the staff throughout their working lives has enabled them, so far, to do without continuing training. This could be explained by the fact that the technological innovations introduced by the firm have never involved a drastic change in equipment operation and the employees could easily adapt to changes through learning at the workplace.

In-company informal training	Used by the firm		
	Often	**Sometimes**	**Hardly ever**
learning something new under the boss' responsibility or that of an experienced worker	3	1	1
learning something new by helping an experienced worker	1	3	1
by performing tasks with an increasing degree of difficulty	2	3	0
learning by asking your direct superior for help	1	3	1
learning by asking an experienced worker for help	2	2	1
learning through problem-solving	4	0	1
learning by visiting trade fairs	0	3	2
learning by regularly rotating jobs in which you can update your knowledge	2	1	2
learning by doing uncommon jobs	1	2	2
learning through problem-solving with colleagues	0	3	2
learning through the explanations given by experts or experienced workers	1	3	1
learning from the direct participation of other workers	0	4	1
learning from clients'/product users' experience	3	1	1
learning from clients' complaints	2	1	2
learning by getting involved in management, planning, etc.	0	4	1
learning by working on your own in your free time	1	2	2

Owing to the total lack of continuing training, it can be assumed that learning at the workplace becomes more important. The analysis of the questionnaires completed by the employees (including the administrator) confirms that learning methods are oriented towards internal processes. Of the 24 items related to learning in the questionnaires, the 8 which imply external relations or technological innovations are *hardly ever* used. However, there are two significant exceptions. Firstly, the items which imply relations with clients do not appear in this section, but receive rather different treatment. Secondly, visits to trade fairs are also considered as a learning method which is *sometimes* used.

The five employees agree that 7 of the items are *hardly ever* used:

- learning through manuals (5)
- learning by practising with new equipment/computers and/or software (5)
- learning by visiting colleagues in graphic arts firms (5)
- learning by asking the supplier for help (4)
- learning by asking experts in other firms for help (4)
- learning by asking for help from the importer's/supplier's technical department (4)
- learning through self-access manuals, etc. (4)
- learning trough suppliers/distributors specifications (3).

Regarding the other 16 items, it should be stressed that most employees (that is to say 3 or more of them) consider that only 3 are *often* used: learning something new under the boss' responsibility or that of an experienced worker; learning through problem-solving; learning from the clients' or product users' experience.

There are 4 learning-related items which 2 out of 5 employees consider *often* used:

- performing tasks with an increasing degree of difficulty
- learning by asking an experienced worker for help
- learning through regular rotation in jobs where you can update your knowledge
- learning from clients' complaints.

However, it must be stressed that at least two of the other 3 employees consider that the first two items are *sometimes* used, whereas the last two items are *hardly ever* used.

The other 9 items are used at least *sometimes,* according to most of the employees.

The analysis of the different learning methods does not give a clear impression of which of them are preferred by the employees. In other words, we cannot establish clearly a number of favourite items explicitly based on internal social relations or those explicitly related to production processes and problem situations.

Regarding the learning value attached by the employees to the different items, the number of those with *a lot* or *a great deal* of learning value is reduced to 12. All of them are items which are used at least *sometimes*. But 4 of the items used *sometimes* are not given much learning value:

- learning by doing uncommon jobs/tasks
- learning through the direct participation of other staff members
- learning by getting involved in management
- learning on your own in your spare time.

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Of the other 12, only 2 - according to the majority opinion - have *a great deal of* value. There is one item (learning by performing tasks with an increasing degree of difficulty) which is *often* used, according to the majority. The other 10 items are accorded *a lot* of value by the majority.

In other words, the items to which *a great deal of value* is attached are working processes which involve difficult situations. The problems relating to technical or management matters are excluded, which on the one hand reveals that exceptional failures do not occur so often and there is little active participation from employees, and on the other hand, it confirms the impression about the informal hierarchy within the firm, in which all the employees are, at the same time, partners. They are involved in management processes only *sometimes* and that involvement has *little* learning value attached to its.

	How much have you learned through this method ?		
	A very great deal	**A lot**	**Little**
learning something new under the boss's responsibility or that of an experienced worker	1	3	1
learning something new by helping an experienced worker	1	3	1
by performing tasks with an increasing degree of difficulty	3	1	1
learning by asking your direct superior for help	1	2	2
learning by asking an experienced worker for help	1	3	1
learning through problem-solving	3	2	0
learning by visiting trade fairs	0	3	2
learning through regular rotation in jobs where you can update your knowledge	1	2	2
learning through problem-solving with colleagues	1	2	2
learning through the explanations given by experts or experienced workers	1	3	1
learning from clients'/product users' experience	1	3	1
learning from clients' complaints	1	2	2

Great learning value is attached to all those items which explicitly imply social relations with the other employees and with clients. There is an exception which is difficult to explain, i.e. the item 'learning through the direct participation of other staff members'.

Regarding the evaluation of the use of learning methods, the use of 4 out of the 24 items is *unnecessary* according to the majority of employees. Those are items which are *hardly ever* used and have a *little* learning value attached to them:

- learning by visiting colleagues in graphic arts firms
- learning by asking the supplier for help
- learning by asking experts in other firms for help
- learning by asking for help from the importer's/supplier's technical department

	Believe that the firm has to use this method to a greater extent
learning something new by helping an experienced worker	3
learning by asking your direct superior for help	3
learning through the explanations given by experts or experienced workers	3
learning by asking an experienced worker for help	2
learning by practising with new equipment/computers and/or software	2
learning through problem-solving	2
learning from clients'/product users' experience	2
learning from clients' complaints	2
learning through self-access manuals, etc.	2

As regards the other 20 items, a majority of employees consider that 11 items *are used to a sufficient extent*. With regard to the remaining 9 items, the following should be used to a greater extent, according to most employees:

- learning something new by helping an experienced worker
- learning by asking your immediate superior for help
- learning through the explanations given by experts or experienced workers.

The fact that the interviewees quote those three items reveals that they recognize that the professional know-how gathered by the firm could be better exploited. In other words, they demand a greater dissemination of the professional know-how existing in the firm.

As regards the other 6 items, a substantial minority thinks that they *should be used to a greater extent* (see the chart above), whereas a majority thinks that they *are being used to a sufficient extent* or that their use is *unnecessary*.

It should be pointed out that the items demanded either by a majority or by a substantial minority include the two items which are *hardly ever* used in the firm (learning by practising with new equipment/computers and/or software, and learning through self-access manuals, etc.), which reveals slight deficits regarding the technology in use, that is to say, the new technologies available on the market would enable the firm to modernize the equipment used and to fill the gaps identified in the updating of knowledge about new developments in the graphic arts industries.

Summary

Although the analysis of the training structure in the firm reveals that the initial certified training level is low, its professionalism can be considered high, on the basis of the initial training level and the experience acquired.

The firm is not making use of any continuing training mechanisms and its adaptation to change is focused exclusively on on-the-job learning mechanisms. The analysis of the questionnaires revealed that such mechanisms are almost exclusively oriented towards internal processes, with some striking exceptions: the firm resorts to visiting trade fairs to get to know about the current situation in the graphic arts sector, and it makes use of its clients' complaints, which reflects the application of the philosophy of a client-oriented business.

The analysis of the items according to how often they are applied in internal learning processes does not reveal a clear preference for a specific type of learning, if we distinguish between the methods based on social relations, those based on processes themselves and other types of learning methods. On the other hand, the evaluation of the items according to their training value reveals a preference for those items oriented towards production processes and problem situations. Finally, the evaluation of those items which should be used to a greater extent reveals a clear preference for learning methods based on social relations and the use of new technologies and working techniques. It can be inferred from this that the workers-partners are aware of the fact that the professional know-how gathered by the firm could be optimized through improved dissemination and that the firm's technological level is not optimal with regard to the technology available on the market.

3.3 A forward: an Irish pre-press firm

Characteristics of the enterprise

Printset and Design Limited was established in 1979 by the entrepreneur and a partner who had a background in design. Shortly afterwards, the partner sold his shareholding to the entrepreneur and he and his wife are now the sole shareholders.

The entrepreneur had extensive experience in the printing industry firstly as an estimator/cost accountant in a large printing firm and subsequently as a production manager in a smaller printing enterprise.

The firm provides a range of services encompassing design, layout and typography of books for a range of large public and private sector clients. Two points need to be emphasized: firstly, the company concentrates on books, catalogues and corporate publications, and rarely undertakes work relating to business stationery such as business cards or letterheads. Secondly, most of Printset and Design's customers are large and many are in the public sector such as government departments. While public sector customers do not provide high-margin business, they always pay; in all of its years in business, Printset and Design has never had a bad debt of any substance.

'A lot of our customers are companies we don't have to worry about paying money eventually.'

The company concentrates on large projects such as annual reports and corporate documents and has developed an expertise in handling books which are to be printed in a number of European languages. In this respect, Printset and Design is in a niche sector of the design and typesetting market in Ireland and has few direct competitors. The company has built up an expertise over the years in being able to work with all EU languages and to handle text from a variety of word processing programmes and computer platforms.

Printset and Design has spent a considerable amount of money on developing hardware and software systems to be able to typeset books in a wide range of different European languages.

In previous times the company used to provide design and typesetting services for larger printing companies but this does not happen now.

The company does not disclose financial information but sales have been healthy. The company did achieve higher sales during the late 1980s and early 1990s when there were a lot of corporate take-overs on the Irish Stock Exchange, which resulted in increased demand for publications for shareholders on the part of the targeted company and the company trying to take it over.

Printset and Design provides a wide range of services: typesetting, design, layout, typography, colour scanning and originations. However, the entrepreneur says the business has evolved beyond merely providing design and typesetting services. At the request of customers, the company started to provide a project management service whereby it would manage a project from design through to typesetting to origination and finally to printing. In the early days, the company worked with three or four printers but in 1990 the opportunity arose for Printset to acquire one of them. Almost all of Printset and Design's work is now printed by the subsidiary printing company.

The entrepreneur says that in providing a range of services in-house, Printset is slowly arriving back at a situation where printers undertake a wide range of activities.

'Nowadays, not many printers are giving the full service. About twenty years ago printers used to offer a full range of services from typesetting on through printing. Since then there has been a great deal of splintering of activities. Typesetters set up on their own; designers set up on their own; book-binders set up on their own; and printers concentrated on printing. Recently, some of these operations have started to come back [into printing firms].'

In the splintering of activities, typesetting firms began to focus on originations when demand for typesetting services declined and the reprographic firms concentrated on colour scanning and separations. Printset currently undertakes both typesetting, origination, scanning and colour separations. The entrepreneur believes that because of Printset's core strength in typesetting it has more advantages over a reprographic business which tries to add typesetting to its range of services.

Printset and Design has a range of equipment including two image-setters and a full complement of computer hardware (mostly Apple Macintosh). The company uses a range of software programmes such as Quark Express, Macromedia Freehand and the Adobe suite of programmes of PageMaker, Photoshop and Illustrator. The company also has electronic mail facilities and will often send customers proofs of projects using Adobe's portable document format.

The company employs six people including the entrepreneur. Three of the six are female, one of whom is currently on maternity leave. In addition, Printset had a No 2, a production manager, who is currently working in the printing subsidiary company.

Five of Printset's staff have been with the company for over ten years and one has been an employee since Printset was founded in 1979. The sixth employee is a new typesetter/scanner who joined the company in 1996.

Printset operates from a three storey building which is located just to the north of Dublin city centre. The printing subsidiary operates from another location and it is the entrepreneur's intention to find a premises which can accommodate both businesses.

In the future, the entrepreneur says the typesetting and design sector is likely to be increasingly affected by emerging trends in electronic publishing.

'Electronic publishing is the glorious uncertainty: how much to invest? How much to train? Some programme will do for a competitor what it costs your company ,10,000 to train somebody for. Take Hypertext Markup Language (HTML, the most frequently used programming language on the World Wide Web) as an example; before, someone would have to be trained in HTML but now word processing programmes such as WordPerfect will translate documents into HTML for you. We are facing a dilemma with a more advanced form of HTML, the Structured Mark-up Language (SGML). The difficulties we face is that SGML might not take off and if it does, we face problems in recruiting and training suitable people. It is not easy to get people who are trained in SGML and it is not easy to hold on to them. Then there is the difficulty that not everybody teaches SGML. If you train somebody in SGML it is not easy for them to pass that knowledge and training to a colleague. Additionally, are customers willing to pay for SGML experience? Bigger companies can afford to send 2 or 3 people on a (SGML) training course... we would find it very difficult because of our small size to send one.'

Work organization

As noted above, the business employs six people, one of whom is currently on maternity leave.

Prior to its purchase of the printing company, Printset and Design had a No 2 who was responsible for organizing the scheduling of work. The No 2 was, however, assigned to act as a No 2 in the printing subsidiary and because the printing firm operates from different premises, he does not currently have a role in Printset. It is, however, the entrepreneur's intention to find a building in which he can accommodate both the printing subsidiary and Printset. When this happens it is possible that the No 2 will have a production management role for both companies. Currently, the entrepreneur is carrying out the role of the No 2 in Printset in addition to his role of managing director.

A number of years ago the business employed up to ten employees but a combination of a drop in some of the work undertaken by typesetters and computerization meant that employees who left were not replaced. In the early years of Printset's business the typesetters were responsible for text input as well as typesetting; now most of the text is provided by clients on diskette and hence the amount of text input undertaken by the typesetters has been significantly reduced. However, where personnel were replaced the type of skills of the person recruited was more likely to include design capability and/or knowledge of colour scanning. The people who left the company were more likely to have skills in traditional typesetting of whom three emigrated and one left to become a homemaker.

The organization of the company is that the entrepreneur is the managing director and has five employees reporting to him. He has a receptionist who looks after the book-keeping and purchases and four typesetters/designers.

One of the typesetters works from five o'clock in the evening to two o'clock in the morning. This working arrangement has been utilized by the firm for the last fifteen years and has found to be necessary for a number of reasons. Firstly, the entrepreneur says that typesetting machines were very expensive and that they were lying idle all night; having an employee who took over from a colleague at five o'clock allowed the machines to be used for twenty hours per day. Secondly, it avoided the need to get day-time staff members to work overtime at short notice if clients contacted them late in the day to get a job done in a hurry; with a night-time typesetter Printset could simultaneously offer the client a fast turnaround time without disrupting the leisure time of day-time employees. The entrepreneur says that this working arrangement - which is also utilized in large printing firms - allows him to plan a lot better. The arrangement has also brought in extra business to the firm. At one stage, there were two people working at nights: the current night-time typesetter and a part-time female typesetter.

The entrepreneur is the main business generator in the company and he is the only one who will go out and visit customers. Before the No 2 left to go to the printing subsidiary, the entrepreneur's principal operational role was to get business and to oversee the running of the business. Now he has had to take on the additional responsibility of supervising the work schedule.

As Printset specializes in book work it is not unusual for the typesetters to be working on the same project for a number of days at a time. The fact that most of Printset's orders are large reduces to some extent the amount of time that the entrepreneur has to spend ensuring that staff have enough work to do. He says that if Printset was an image-setting bureau with lots of small orders his production management role would be more intensive and demanding of his time.

'Most of our work is large contracts . . . we could have someone on the same job for a whole week . . . because we have a good mix of jobs I don't have to be looking every quarter of an hour at what has to be done.'

Another factor which eases the entrepreneur's supervisory burden is that the type of work is usually not associated with very tight deadlines. In many situations, the company is often waiting on the customer for example to give its approval on a proof. Printset has a high quality colour proofing system which allows customers to 'see a job as it is going to be'. The entrepreneur will typically send them proofs at each stage of the production process to review and make amendments. Since it can often take the customers a number of days to respond to the latest proof there is the flexibility in the system to move on to other projects.

When a customer places an order with Printset, the entrepreneur will have a good idea which of his staff (or combination of staff members) will be responsible for executing that order. Because most of his staff have been with the company for some time he has a

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good knowledge of their strengths and weaknesses. Wherever possible, he tries to ensure that a staff member will be responsible for the project from start to finish and, because staff members have different approaches to design, to avoid a situation where one staff member will start a project and another finish it.

'I trust certain people with certain jobs. It is not recommended to change a job half way through because each person has their own style.'

Orders which just involve black text such as a book can be entrusted to any one of the four.

Where the order requires a design content, the entrepreneur will give that to the designer who will mark-up the page and specify where text and visuals are to appear. The design will then be passed on to someone else to be typeset and to prepare the visuals. In some cases, the designer may also do the typesetting himself as he has trained himself in computer-based typesetting.

The designer will have an input into most projects. In the case of a project where a report is going to be published in a number of different languages the designer will prepare the first book which then becomes a design template for the books in the remaining languages. If the work is a repeat order of something which Printset had done for a client in the past, then the designer would not be involved and the job would go straight to the other staff members.

If the work involves mostly typesetting it will be given to the night typesetter though all the production staff can handle this work. However, where a project involves output to SGML this work will be entrusted to the night-time typesetter who is the only staff member to be trained in this technology.

Where visuals such as scanned photographs and graphs are required the designer will specify where they are to be positioned on the page. The scanning of photographs and illustrations are undertaken by the two female production staff members. Both have training in the use of scanning and in the use of sophisticated image manipulation software. They will prepare the visuals which they will then use in publications they are working on and if the visuals are required for their male colleagues, the designer and night-time typesetter, they will be stored on the computer server until required. Neither the designer nor the night-time typesetter have any training in the use of scanners or in image-editing software programmes such as Adobe Photoshop.

When the project has been typeset and approved by the client it will be output to film and then sent to the printer.

Though most of the firm's work is not deadline-driven the fact is that there is a typesetter on duty fifteen hours a day. Additionally, all four production staff - and even the entrepreneur himself if required - can typeset. Both of these factors give Printset the flexibility to meet tight deadlines.

Prior to his transfer to the printing subsidiary, the No 2 - whose father had been a No 2 in the firm - was responsible for organizing the scheduling of work. This meant that the entrepreneur could concentrate on getting new business and running the business. More importantly, having a No 2 allowed him to focus on long-term strategic planning and on identifying business opportunities. The purchase of the printing firm was the result of such long-term planning. The entrepreneur recognizes that the current organization of the company is not optimal, but hopes to find premises in which both Printset and the printing firm can be housed together. When this happens the No 2 can be shared between the two businesses.

Management and recruitment

Within the company there is extensive expertise both in printing and in design and typesetting. The entrepreneur previously worked for a large printing company as an estimator and in that job studied all tasks carried out by the company, which specialized in book-work. He then moved to a smaller company before establishing Printset and Design in 1979. Since his days with his first employer, he has earned qualifications at night in a number of areas.

'I did every course in Bolton Street [College of Technology]: estimating, printing, etc. ... I also got City & Guilds qualifications'

Three of his four production staff have been with the company for over ten years and in that time have gained knowledge and expertise in the design and typesetting of book-work.

The newest member of the production team joined the company in 1996 and previously worked for a reprographic company in London. Unlike her senior colleagues she does not have a qualification but has work experience in using scanning equipment. She replaced another scanner/typesetter who had to be let go and who in turn replaced a similar employee who also was let go after a short time with the company.

With regard to the two people who had to be let go in quick succession, the entrepreneur admits that he has had problems in finding the right person for the job.

'It is very hard to get good people. It was easier years ago; a good typesetter would be well known. Now, there are so many people with varying quality of training and expertise. Before, when people did the traditional apprenticeship type of training, you knew that they knew the basics.'

The problem as far as the entrepreneur is concerned is that though the people coming on the labour-market may have received training in image editing-software programmes, such as Adobe Photoshop, that training does not take into account the processes that take place before or after the scanning/image editing stage.

'They may be computer wizards but they don't know about simple things like printers' marks. They don't know about printing technology; they have never seen a printing machine. They don't know about 2, 3 or 4 colour printing presses. They don't know what spot colour is.'

Some of the people who were taken on and let go over the years had computer skills but were ignorant, for example, about proof readers marks. Though it never actually happened, they might not make changes to a proof which a client had corrected. What was worse from the entrepreneur's point of view was that they were unwilling to let their ignorance show through.

Though the new staff member does not have the same level of experience of her senior colleagues in typesetting, scanning or printing she is prepared to ask if she does not know something.

While he recognizes that it is not necessary to have a four to five-year apprenticeship, the entrepreneur suggests that the computer-based typesetting and image-editing software training programmes incorporate instruction on general typography, how to handle paper, types of paper, spot versus process colour, types of printing machines (2, 3 and 4 colour), etc.

Having to let two people go was not an easy decision for the entrepreneur:

'I don't let people go lightly. It takes a lot out of me personally. I can handle a lot of things. I can handle all kinds of things: I can handle money (I can handle not having money!) but I hate letting people go ... especially since we are such a small place.'

He admits that he is not very proficient with interviews and sometimes allows people to over-sell themselves. He also feels that while the younger members on the labour-market can be geniuses on the computer but lack knowledge of other parts of the printing process, there are problems too with people with a traditional apprenticeship background. The people in this category have good knowledge of the printing process but have to be trained in computers, which is an integral part of typesetting and design.

'The traditionally trained people can be too traditional for the new machinery. What I need is a person who has typesetting skills and is computer literate as well.'

The entrepreneur feels that recruitment and selection is a weak area for him and in the future, because of his recent experience with the two above-mentioned employees, might consider using a recruitment consultant:

'The next time I have to recruit I will employ someone to do the recruiting for me.'

He recognizes that there are disadvantages to using a recruitment consultant because it would not be easy to find a consultant with expertise in the typesetting and printing sector in Ireland and to be successful the consultant would have to be very well briefed.

His people management philosophy is to understand each staff member's skills and expertise so that he can have a better understanding of the type of work for which they are best suited and to organize the distribution of work accordingly.

'I try to nudge people in the direction of what they are good at and away from areas in which they are weak'

Education, schooling and training

Formal qualifications and training

All of the staff has a formal qualification and, as noted above, several in the case of the entrepreneur. The one exception is the most recent recruit to the production department who joined the company from a reprographic firm in London where she was trained in the use of colour scanners.

The designer/typesetter studied design in the College of Art in Dublin and has been with the company since 1986 and previously worked as a graphic designer/make-up in two other companies. Since he joined Printset he has undertaken training in the Apple Macintosh system and in page-layout software programs.

The senior female typesetter undertook training in camera work and printing in Sligo Regional Technical College before she joined the company in 1979. Since then she has learnt to use the Apple Macintosh computer and a range of software programmes in page layout, illustration and image editing. Most of the training in using both the hardware and software was provided by suppliers. However, most of her skill and knowledge she has gained in computer hardware and software has come from using the manual and experimenting. According to the entrepreneur, she is a 'natural' when it comes to using software. He says that it is often the case with software training programs that she will know more than the trainer. She has a reluctance to attend outside training courses because many software training programs are (a) geared at beginners and (b) do not relate to the needs of those in the typesetting and design sector. Additionally, though the entrepreneur had planned to send her to a specialized three-day scanner training programme in England it was not convenient for her to attend because of family commitments. Instead she had to resort to holding long cross-channel telephone conversations with the trainer.

The night-time typesetter who is the oldest employee is the only person in the company not only to have undergone an apprenticeship but also to have served his apprenticeship when companies were using the 'hot metal' approach to typesetting. Since he joined the company in 1984 he has been trained in the use of computers and in page layout software programs. Earlier this year, he received training in a software program to convert files from Adobe Framemaker, an advanced page layout program, into SGML, a more advanced form of HTML, for distribution on the Internet.

The newest recruit to the production department has no formal qualification in typesetting but has extensive experience of scanning and image editing from having worked for a UK reprographic house.

The entrepreneur does not undertake a formal analysis of the skill needs of his production staff. However, if a client asks for a project which involves the use of new software or a new approach he will research how best Printset can meet that customer's need. If a new piece of computer software is needed, some information can be obtained from the supplier. It is more likely that the staff will spend time using the manual and using their experience of other Macintosh software programs to understand its best features. Though it has not happened often, customers will sometimes ask Printset to prepare an Internet version of a printed publication. The development of webpages is a new area for Printset and though through the designer they have in-house design expertise they do not have experience in coding. Printset has been able to fill this gap in the short-term by using the entrepreneur's son, who is a student in information technology. In the longer-term - and depending on customers' demand for webpage creation, it may be necessary to train a staff member in webpage programming. Since new customers can be hard to come by, the entrepreneur says that he would be prepared to lose money on the first job in training a staff member in a new software program or technology, rather than risk losing a potential customer completely.

'The designer has a good concept of web design but the coding is another matter. It is a catch-22 situation; which comes first: the skill or the design? Do we develop the skill in coding and market that to customers? Or do we wait for a customer to approach us to design a webpage? Is it worth it? We are in the printing business and we might have two customers approach us on web design in the next two weeks and then nothing for the next six months.'

Much of the training that takes place in the company is, therefore, directly related to the needs of customers. The training that the night-time typesetter received in SGML is a case in point. One of Printset's largest customer requested a SGML version of a published document to put up on their website. To deliver on this customer's request, the entrepreneur had to employ a UK consultant to advice him on SGML and the type of training that was required.

It was also necessary to use a UK trainer in SGML because there was a lack of trainers in Ireland with SGML experience. The UK trainer spent a week with the night-time typesetter, who was the only staff member that the entrepreneur could afford to release time-wise for the training.

The experience of the SGML training highlighted a number of issues to the entrepreneur. Firstly, it is often difficult to find trainers in new technologies in Ireland, which means that there is the additional expense of bringing UK trainers over to Ireland. There is the related danger of not being able to assess training courses is advance. Secondly, there can be difficulties finding not only good trainers with the right knowledge but ones who can also relate that knowledge to Printset's own specific market sector. Thirdly, being a small company and relatively short-staffed, it is difficult to release staff members to undertake training programmes - particularly those lasting more than a day. Additionally, there is also the danger that developing a new set of skills may require substantial investment in staff time and resources.

'My worry is that I don't have time to vet how good courses are. I have a suspicion that trainers don't know about printing. Our situation now is that we don't need basic courses but very advanced courses, e.g. SGML, but often we are not likely to find them here [in Ireland].'

Where the only option to learn a new skill or software program is to attend an external training course, the entrepreneur will often just send one staff member who will then be responsible for training his or her colleagues.

'Take a software program: the outside guys will show us on a one-day training programme. One person will go on that training and pass it on to the others. We are usually under so much pressure that I cannot afford to have people out [on training courses]. It is not the cost of training but the lost time.'

Informal methods of learning

One of Printset's strengths is the experience of its employees and the fact that most of them have been with the company for over ten years. There is also a good diversity of skills: design, typesetting, scanning and image editing. There is also a good knowledge within the company of the way in which typesetting and design are integrated into the whole printing process.

Those strengths show themselves in that staff members are prepared to learn from each other and to add to their existing knowledge. At the same time there is a realization that it is not feasible to train staff in every specialist area. For example, the designer does not do any scanning or image editing: that is left to his two female colleagues. Similarly, the latter do not get involved in design matters because though they have a basic competence in design they would not have the same experience and training.

The fact that employees share knowledge with each other is supported by the analysis of staff questionnaires which shows that all five respondents indicate that learning by asking help/advice from an experienced colleague is a regular occurrence. Two staff members rate this form of learning very highly and they would prefer it to be used more often. By contrast, the forms of learning that involve outsiders such as experts or other type-setting companies rarely take place within Printset. There is, however, some support for the view that these forms of learning should be used more in the future. Similarly, learning from the experiences of clients never takes place according to the majority of respondents but here too the majority would favour more usage of this form of learning.

The night-time typesetter is the only person within the company who has undertaken a training course in the last three years. Earlier this year he received a week's training from a UK-based training consultant who travelled to Dublin to provide a course on 3b2, a program which converts files from a page layout software program to SGML. He was selected by the entrepreneur for this course because none of his colleagues were available.

It is perhaps not surprising that the night-time typesetter who works on his own most of the time highlighted the importance of learning from manuals as a regular occurrence in the firm. He also indicated that learning by asking the entrepreneur or an experienced colleagues happens now and again.

The designer in completing his questionnaire highlighted that the learning that took place most often in the firm was learning through helping an experienced worker, learning by solving problems by himself, learning from suppliers' instructions, learning by solving problems with colleagues and learning from direct employee participation. He rated most of these learning methods very highly though he indicated he would prefer to see learning by practising with new machines, learning by visiting other printing/design firms and learning by excursions/visits to firms used more often in the company. The designer said that learning from the experiences or complaints of clients did not happen in the company and he indicated that these forms of learning were not necessary.

The senior female typesetter (who is the longest serving employee in the company) stresses the learning by oneself, i.e. not involving others, as the most commonly used form of learning. For example, she says that learning by using manuals, handbooks, etc., occurs regularly and it is the method from which she learns the most. Other self-learning forms utilized include doing work with a growing degree of difficulty, problem solving on her own and practising with new machines. She does, however, express a preference for more utilization of forms of learning that involve external inputs such as the experiences of experts or customers.

By contrast, Printset's newest recruit emphasized the learning that takes place from interacting with experienced colleagues and believes the forms of learning that involve learning new things from an experienced supervisor or colleague should be used more often. She gave a low preference to forms of learning that, for example, involved suppliers or companies similar to Printset.

The entrepreneur listed many forms of learning which he indicated should be used more often in the company. One such form of learning was learning by excursions/visits to fairs.

'I have picked up a few things at exhibitions: I have attended a PC exhibition in London where I was able to see a few smaller exhibitors who are not represented in Dublin. Smaller companies for example dealing with multiple language capability products - there is more emphasis on software programs dealing with different languages in the UK [than in Ireland].'

Summary

Printset and Design Limited is a small design and typesetting company which specializes in book-work and has developed a reputation for being able to typeset books in different EU languages.

The company was established in 1979 by the entrepreneur who previously worked as an estimator/cost accountant for two printing firms. He and his wife are the sole shareholders in the company, which currently employs six people.

Printset employs four people in its production department: one designer whose principal function is graphic design but who has also been taught to typeset; a typesetter who works at night; two people who also typeset but whose main responsibilities are in scanning and image editing. Until recently the company employed a No 2 or production manager but he is now the No 2 of the printing company which Printset recently acquired. This means that in addition to his managerial and sales roles, the entrepreneur is also responsible for the organization of work within the production department.

With the acquisition of the printing firm, the entrepreneur is now in a position to offer an integrated range of design, typesetting, origination and printing services to clients. This project management service is likely to become more pronounced when he finds a premises which can accommodate both Printset and the printing company.

The majority of Printset's employees have been with the company for over ten years. Printset has experienced problems finding trained employees with (a) knowledge of the computer hardware and software used in image editing and typesetting and (b) with familiarity with printing processes.

Though all but one of the production staff obtained qualifications before they joined the company the company has developed their expertise in using computer hardware and software programs. A case in point is the designer who did not use computers before he joined Printset: since then not only has he learnt the Apple Macintosh system but he has developed expertise in the use of computer page layout programs.

Market factors have had an impact on the continuing development of staff; for example, a number of Printset's clients have requested electronic as well as printed publications. This has required Printset to develop skills in adapting publications for dissemination on the Internet.

One of the difficulties that Printset faces in the continued vocational development of its production staff is that many of the specialized training programmes are not available in Ireland. These have to be obtained from the UK, which means a higher cost to the company. The biggest difficulty from Printset's point of view is, however, in a firm of four production staff (one of whom works at night) is being able to release even one person to attend a training course.

Informal learning methods are quite important within the company, particularly since there is a range of skills and expertise within the production department. If one person attends an external training programme he or she will be responsible on their return for training their colleagues.

3.4 A centre: a pre-press firm in The Netherlands

Characteristics of the business

Brief history

This pre-press has existed for ten years. The owner/entrepreneur started his business in 1987 at the age of 41. Until then he had been working in a plant of one owned by the biggest litho-companies in The Netherlands. In that company he set up composing shop in two different cities. Being a works manager in one of these two composing shops he did not have the opportunity advance further and he therefore started a business for himself in a nearby city, where there was no composing shop at that time.

'I worked there as a works manager for the composing shop, but I wanted more ... and at that time there were no better opportunities in that company and to sit and wait for that .... Here in N. there was no longer a composing shop at that time, so it seemed natural to start here. I made a business plan and so ... you know. I did not want to start with any old rubbish. If you are 41 then you should take it seriously one more time. I was able to raise the money easily, curiously enough.

The business started in the period of technological transition towards the computer and the business made use of that at once. 'The Apple Macintosh had just arrived. During a demo by the supplier I saw all that was amiss ... was not very typographical ... but I had faith in its possibilities. I then bought two Apples, one more PC system, an exposer, which *could be directed by a postscript printer: with that I was here in the eastern part of the country the second one. '*

The business also started out as a composing shop in the first instance. Especially the becoming available of big type-libraries at very low prices was crucial for the further development of this kind of business. In fact the business developed fast; within one year it already had 4 or 5 employees.

Two years after the first business was started, the entrepreneur bought up another company, which was on the brink of bankruptcy. This business was established in a nearby town of about the same size as the first place of business, also in the eastern part of the country. Again, one year later, a third business has been set up.

'I did this because I thought if I only would be located in the eastern part of the country then I would be really in the province and about Veenendaal people there in the western part have heard occasionally...'

The business in Arnhem also started initially as a composing shop, but at the moment all three businesses have their own specialisms. In Nijmegen there are a few exposers and there is a pre-press floor, specializing in the more complex and faster work. On a regular basis, about 10 to 12 magazines are manufactured there weekly. In Arnhem there are the bigger exposers and there are also the scanners.

In Veenendaal they work with the latest technologies: CDs and home pages for Internet are manufactured there and an Internet server is also available. Consequently the focus is no longer on the traditional printing industry information medium 'paper', but on the new information media. The business in Nijmegen is subject of this study. In this establishment a machine will be shortly installed for digital printing.

Market, products and services

The business in Nijmegen is a traditional graphic pre-press business, which at this moment offers two products/services to advertising agencies, publishing-firms and other companies in need of printed matters.

For most of the advertising agencies the data, which the agencies make up mostly themselves, are set on film. With the help of these firms the agencies then have their work finished off by printing houses (print-making, printing, etc). The pre-press business does not play a part in that.

The business being studied encouraged advertising agencies to start making up their own work, initially only text but later also with images. At present the business plays a part only in the make up of really difficult matters such as image manipulation. The advertising agency thus gradually started to carry out more and more activities for itself, which of course has everything to do with computers, and particularly of software, constantly becoming cheaper and more consumer-friendly.

'... the customers could also work very easily with those programs. Before one had first the setting up, the linking up and the making up, and that disappeared all in one go ... actually within a year. I then said to the advertising agency that I would put an 'Apple' in their place ... it is better to push it than to try and stop it. You can't stop it at the end of the

day. The problem was still that I myself could still offer little added value, and in those days I had to get it through work as much as possible. That was also my most difficult year. After that the scanners came and machines to print the RIPs out quickly. So I again started to do more things round and round it… not only to print out a film and then leave…'

The complete make-up work for magazines and books, catalogues, etc. is still done on the DTP floor of his own publishing firms and companies.

'Yes that is still limited. But I was in a limited market too. I started out as a composing shop, dealing only with text. So I went already a step further by taking on images … a small part of the litho-business. So I moved on more and more. But now my principals are doing what I did ten years ago. Of course we still do the make-up of magazines and books, but advertising work has disappeared almost completely; it is done almost entirely by the agencies themselves. Only if it is really difficult do we still it. Once everybody can do this kind of work, it is no longer my market. I have to stay in the top end of the market.'

So in his service business is increasingly shifting towards the most advanced products and production processes.

'Yes, but we do keep on working all the time for the same customers, only we offer other services. Once they look over the composition we had to go a step further. We told them once again to feed into that image yourselves, then we will scan it once again. And so we have moved on to a new style litho-business. Not with traditional equipment but with PCs and Macintoshes.'

As well as further developing of the intermediary role of a pre-press enterprise between the principal of printing matter and printing office, the business has meanwhile taken a step in the direction of new information media such as CD/multimedia and the Internet. The business here is an establishment that specializes in these new techniques and manufactures the complete product itself. So the updating of a catalogue is currently being worked on for a big plastics processing company with a very large range of products. Until this year this catalogue was printed and distributed among customers, but this year for the first time it will be put on the Internet (in nine languages).

'You see, we have knowledge about computers and software. Whether we make a film, a print or something for multimedia or the Internet … it basically does not make that much difference. '

Thus some traditional printed matter disappears, but sometimes old and new information media countinue to coexist alongside one another, as in the case of a camp-site guide.

'We manufacture this camp-site guide once a year; it's a major job. We receive it on a diskette and we finish it off. But what we are also doing is constructing an Internet site for this customer. You see, there are quite a few camp-sites, which have their own home pages, but how can they be found? If you make a site under the camp-site index you can then find everybody. We first made a test-site … it is not running well at present but it certainly will do at some stage. We are also doing that in nine languages; it is a European guide … If it is on the Internet it can become a source of income, because you can ask for money to maintain the data. Consequently you develop your own market. But of course you don't take your PC on holiday, so the old printed guide will stay on … It's an

interesting job because it's an additional market which complements an existing one … you use the same data twice and there's no difference whether it's on paper or the Internet.'

There will be two important developments for the business in the near future: digital printing and computer-to-plate technology. Computer-to-plate technology is naturally a threat to the business because the intermediate film-making step will disappear and that is one of the most important services which the business provides.

That is why the business will start to invest in equipment for manufacturing the printing plates itself and supplying them to printing houses. The problem is that printing houses traditionally manufacture such plates themselves and prefer not to put it out to contract.

'We will see later that we start to expose directly onto the offset plate and film is not needed anymore. That is ideal for our kind of businesses. I am willing to invest Hfl 600 000 - 700 000 to start manufacturing those plates. But printers are wary about that; they want to keep on manufacturing their plates themselves … That same reasoning was used 15 years ago for lithos; they also preferred to do that themselves. But litho-companies did ensure that standardization took place; we provided a standard quality which any printer can get by with. The computer-to-plate market is similar. I guess that I can convince printers that they can make use of it in any case for a number of years, until it gets cheaper. That applies certainly to the smaller and medium-sized companies. They do not have such a big demand for plates that they can make that high an investment. You see, I can do it for about 400-500 customers, and so for me it is feasible. In that area I feel that I again have a mission to make it clear to everybody that that is the solution for many printers.'

But the entrepreneur has every confidence that he can win that market for himself.

'We will just start to do it … I guess that once we get it under way, the work will come in. You see, I am printing out all these films for example for a big printing house and they are not doing so well that they are going to start investing in the computer-to-plate technology themselves … they are currently using about 1000 plates a week … if I can start to make the plates for them … what are we talking about then, then I just do that and the others will follow automatically. But if I go to the printers and ask them if they need it, then they are bound to say no and they will do it themselves. So I will do it … and I'll set up a 24-hour service as well to solve problems.'

Meanwhile the business has already ordered the equipment for digital printing and it will be installed from 1998 on. For the business this step is comparable to the CD/multimedia and the Internet market because in the case of digital printing too a complete product is supplied.

So far the company has provided its services mainly as an intermediary to companies in the pile but it is different now. In fact the business will start offering this digital printing to the same customers it is already working for. But it is then a matter of smaller copies of eminent coloured printing matter that can be manufactured more cheaply on a digital machine because the intermediate steps of film and plate-making have been dropped.

'Digital printing is actually much more difficult because you start right away to manufacture a complete product. Now we are just a small intermediate link. But I don't want to start now profiling myself as a printer on the market: I only want to be a logical extension to what is already there. If someone wants 500 brochures in four colours, why should this start to make films first, to make plates ... at those prices alone I can already print it. But I will have to convince the printers of that too ... if you have a small edition then come to me. And that's also the difficulty ... how do I make clear to my customers that I have something that they can also make good use of.'

Investment and the future

At the moment the business is very sound financially. Therefore it can easily invest in new equipment, although the way in which the entrepreneur makes his decisions on the matter is different than before. Because the entrepreneur no longer has a full overview of the technical aspects of the new machines, he needs the knowledge of his staff and in particular the more technically trained ones.

'Yes, but I am still the one who has to see the opportunities. But the purchase of hardware and software is done in consultation. If it is software costing a few thousand guilders, an additional computer, a faster one for example ... if they say that that is needed then it will simply be bought; that's not a problem. But with digital printing it's a different story. From the moment it came on the market I saw its possibilities. But it took me three quarters of a year to get the basic staff. I've not had to do that before. I could just tell them there and then that I had bought this or that. Now I have to get a basis indoors because with three companies you have to be convinced that something can be made. They also have to be convinced that it has to be purchased. And if they then hear the amounts they are staggered: we also have to earn that all back again. But you shouldn't be so afraid of it: it is borrowed money and I build escape clauses into the financing. You have to do that because you can be convinced that you can make a lot of money out of it but it still has to be proved in practice. Maybe you run too far ahead of the market.'

With his investments the entrepreneur is guided by two things: a new product should have a high added value and it has to add something to existing package of services of his business. He also tries to recoup the investment as soon as possible within no more than five years and if possible within three years.

'You see now ... for ten years now I have been able to supply films with the same equipment. But if I now move to computer-to-plate I think that I can only make money with that for five years. Converting to another technique is happening at ever shorter intervals. And the same will happen with digital printing. Five years down the road everybody will be able to purchase a digital press, then the quality will be also much better than now ... and then there will be something else for us to do. You see, that is yet a disadvantage of this time: it all looks quite good now, but it is only temporarily. If you open a grocer's shop then you know that you can sell butter and sugar for the rest of your life... but here I don't know what I will be doing next year.

Yes, the difficult thing for a small enterprise is also to determine the right moment to invest. I know people who bought a big drumscanner 5-6 years ago for six hundred thousand guilders and expensive picture processing apparatus, when you could do the

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same with an Apple and a scanner costing seven thousand guilders: then you have a problem ... I now assume that I have to earn it back in about three years ... or even sooner. Yes, things are happening fast, but that's also what make it fascinating.

Staff

The entrepreneur is in complete control of the three different sites but in the Nijmegen company he still also has the fields organization position (sales). From the foregoing it is probably clear that the entrepreneur is mainly engaged in entrepreneurship for his three companies. He is hardly, if at all, engaged in the daily management in each of the three companies. (In addition he still has an old-fashioned printing office at home as a hobby and besides his own work still acts as an advisor on the development of the printing industry in developing countries.)

The Nijmegen company also has a director, who also assists, three DTP'ers and two clerical employees. The average age of the staff is not high: about 32 years. The skilled workmen in Nijmegen are all still have a printing education. However, the staff which has recently been taken on in the other establishment does not have a printing background but a technical one.

'I have all the new things like Internet and so on in Arnhem and in Veenendaal and there I don't have traditional printing people anymore but people with an interest in the printing industry. And they also have a technical training of some kind, HTS electronics (College of Advanced Technology) and so. That level one get now inside.

A few years ago you just could get them out on the streets: technical system people, people who know how to programme.'

Developments and reactions of the entrepreneur

Simple work is on the way out

From the foregoing it is already clear that cheaper computers and input and output devices and more consumer-friendly software means that much of the simple work is done by the consumers themselves. This applies not only to printing matter but also to pre-press work. Many customers have started to feed in and make up texts and images themselves.

The entrepreneur has reacted to this by, as already described before, putting his mind to more complex and more investment-demanding matters in pre-press activities and selecting the matters when have a high added value. The entrepreneur has further diversified towards new media. And he has purchased a machine for digital printing, with which he wants to offer new services to other printing companies and other customers for printed matter. Moreover, at the moment he is exploring the possibilities of providing printing offices not with the films but with the plates directly, using new technology whereby the printing plates are manufactured directly through the computer.

Specialization or integration

In the printing industry not only is simple work (feeding, making up, printing, copying) shifting to the customers themselves, there is also a trend in Holland towards printing offices again setting up private pre-press floors.

'Two years ago there was a 'KVGO conference' (Royal Association of Printing Enterprises) 'Pre-press is the key to the future'. That is true, but printers have translated that immediately, as meaning that they should start to do that by themselves. I think, that being a printer, one has to take care; one has to print as efficiently as possible and one has to cooperate with good companies, so that one is not let down. But printers like to do everything by themselves. Printers have recently been putting down more and more exposers themselves. But if a printer is going to invest a couple of hundred thousand guilders in preparatory apparatus, then it is only for himself, while I can work for 300 or 400 customers and use that apparatus much more efficiently. And then there are still printers who say: if we can print, then we will print out the films for free. I don't have an answer to that. I cannot say: if I can print out the films I am going to print for free.'

The question here is whether the printing industry will in the near future tend towards the further specialization of companies or towards the integration of activities in individual companies. The pre-press business at issue is benefiting of course from specialization, and the entrepreneur assumes that this will continue because of costs and efficiency advantages.

At the moment the question is also whether printing offices will leave the manufacturing of plates directly by computer up to third companies. The entrepreneur holds the view that only the big printing offices can afford computer-to-plate technology themselves and that smaller companies should contract out to more specialized companies. Smaller companies will not be able to make this costly technology pay. But the problem is that printers will not readily contract out the making of plates because they think that is an essential part of their own work.

Quality standard is dropping

The traditional quality standards previously employed in the printing industry are no longer applied. They were actually also the standards of the printing business, which were imposed on customers. At the moment the reverse is true. The customer hardly ever demands the same high quality and the printing business can afford less and less to employ its own quality standard. If only for reasons of efficiency, the printing business has to produce the quality which is demanded.

'The printers of digital printing for example shout about quality not being good. A printer still takes his magnifying glass ... but one should not do that. The quality standards have very much faded away. You see, we used to have those big expensive scanners in the litho-business, a printer's proof was done first, after that corrections ... if we had a book with 200 full colour lithos we were busy with that for weeks. Nowadays we do that with a cheap scanner and if we get such an order today, they need the films on Friday and then nobody looks at the quality ... in days gone by the sky was a little bit bluer and the grass

greener. Now those scanned pictures are not looked at so closely anymore … besides the knowledge is no longer there.'

Speed of work

The company states that less emphasis is placed now on quality and more on speed. The business in Nijmegen is especially geared to working fast. But the business has also been organized for that purpose.

'What we can do here well is perform under pressure. We know how to manage difficult programs well and to solve tricky problems; we are organized for that. And because we have plenty of regular customers, who come especially to us with their tricky jobs we have already experienced all the problems. That also gives us a head start.'

A result of the company's position is also that there is no question of a longer-term planning.

'You see, you can hardly plan in this way. Only the bigger things can be planned: you know beforehand when something is coming; but here it is always a surprise what is comes up each day. If customers don't show up for three days the business is idle ….'

Organization and staff

Structure

The organization structure is not very hierarchical, either formally or informally.

The owner/entrepreneur of the business is also the manager of the site in Nijmegen and he does the field organization there, which means that he maintains contacts with the customers. But this site deals especially with regular customers, who come to the company by themselves. The manager does not as a rule have to go after customers. Only in the case of big orders is there consultation at the customer's premises.

At this site, furthermore, there is a man sitting behind the counter, who sees the customers and deals with the printing out of the films. He also receives the work for the pre-press floor. The three DTP'ers on this floor take care of the make up, etc. of advertisements, magazines, books, etc. They usually deal directly with the customers and all three are equal to one another. The administration of the whole company is done centrally in Nijmegen. The two other sites in Arnhem and Veenendaal each have their own site managers, who assist in the production and are also responsible for the field organization. One of these sites has a rapid print-out service and accommodates the scan-floor, where scanning for the whole company takes place. In the Arnhem site the newer activities take place like Internet services.

The three sites are connected with each other through an ISDN link and the company has his own courier service. Also because of the limited distances, communication and the actual division of labour are quite possible between the three sites and specialization by location gives advantages.

Flexibility

The internal flexibility of the company is quite high, although it is a question of specialization by site. Within each site people are available for a wide range of services and can generally take over the work of others. Besides work is also moved between the different sites. Wherever one site cannot cope with the work it can be moved to another. Because of this internal flexibility it is seldom necessary to work overtime, either on a daily or on a weekly basis. Only in exceptional cases, for example because of failure of apparatus, is overtime worked.

Staff qualifications and recruitment

In general the staff has vocational training at secondary vocational education level (MBO) or higher secondary vocational education level (HBO). In the traditional printing positions (DTP, exposing, scanning), employees have also followed the traditional printing training courses but in newer kinds of work like multi-media and Internet services they have technical training at HBO level, where computer technical knowledge and skills are especially important.

The three graphical/technical employees working at the site being studied all have a middle or higher vocational education. The site manager has a higher vocational education in the book business and a higher economic/administrative education. He formerly worked in the automation business. He joined this firm in 1991.

The two DTP'ers have been working in this firm since 1992 and 1997 respectively. One of them has a higher vocational education in 'graphical techniques', the other has a higher vocational education in 'graphical design'. Only the site manager has followed a course in computer technology.

Until now the company has not had to recruit actively to meet the demand for staff. In addition, the growth in the company took place when the labour-market was still easy. It was also difficult for (MBO and HBO) trained workers to get suitable jobs and this company also benefited from that. Moreover, in the beginning the company recruited people who the owner/entrepreneur knew from the time he had not yet started his business.

'Some were people I knew and some people who came to me of their own accord. If you are doing new things, it gets about a little, and people turn up on spec. I've always had that luck. If I needed a new employee I usually received a letter of application or a direct request … and it's the same today.'

About employing more technical trained people, the entrepreneur says:

'For newer techniques I don't recruit traditional printing people anymore; I recruit people with an interest in the printing industry. They usually come from an electronic training courses of some kind, from a College of Technology or the like. That level we can now get in-house. A few years ago you could just pick them up off the street … technical system people. People who know how to programme. They are also the things you cannot do yourself anymore, but with these people in-house you do not have to.'

Apart from that, the entrepreneur now only assists with executive work if necessary. He deals almost exclusively with entrepreneurship and management matters.

'Before I also used to be a kind of stand-by for executive work. I have finished with that, because you no longer have any overview whatsoever.'

(Apart from that the entrepreneur also acts as a consultant on the development of printing companies and training in developing countries.)

Education, training and learning

Participation in the apprenticeship system

The company has taken on apprentices in the past, and recently also trainees of the printing lyceum. But apprentices and trainees are becoming more and more problematical for the company because the gap between their knowledge and skill level and the work in the company is too wide.

'An apprentice from the apprenticeship system is indeed a problem nowadays. The work-rate of an apprentice is much too low. Training should prepare for that by first offering a course in the use of the PC, for example, to trainees before they enter the company ... that could then be built on in the company. I did also have apprentices, but I cannot use them anymore because we are already further advanced than what they learn at school. Last year I also had a trainee from the printing lyceum. But I could not make use of him at all ... it does not fit, he just wasn't suitable. That is also one of the reasons I have decided to work more with HTS'ers, at least they know how to deal flexibly with a computer. You see, the graphical composition is mostly done by the customers. What is a pity, of course, is that new developments take place in the typographical field, surprises are not seen anymore in the printing field ... .'

With regard to the decline of the number of apprentices in the apprentice system, the entrepreneur is especially critical of his fellow entrepreneurs.

'Here too, the GOC has a hard time in coping with developments in training. But employers don't want to train apprentices anymore; the apprentice system is going down at the moment. If things get better later then they will be short of people again and then they will be complaining again that the GOC does not offer enough training ... it is a little bit hypocritical. And also those complaints about the high level of contribution for training, they just don't want to pay a penny towards it.'

Training/courses

There is very little participation in the company in training or courses offered by for example the GOC or suppliers. A number of people did attend a HTML course when the company started with new media.

'You see, how that works, what you can do with it ... and with that they then set to work. They then sit together with a few people and make each other enthusiastic and find out jointly what else is possible ... .'

You usually cannot learn much more from the GOC or suppliers, because you are usually already a step ahead yourself. You also master new versions of software yourself with the help of colleagues and possibly of customers.

'Yes one can start by attending a short course lasting two days, but that level is usually too low for us. You master 80% and those extras you learn best from and with each other... No, even with somebody from the GOC or a supplier: we ourselves are just a small step ahead most of the time after all.'

The three employees questioned are of the opinion that informal learning is important. The site manager mentions the following methods as very informative:

- learning by using handbooks, manuals, etc.
- learning by solving problems by yourself
- learning by practising with new equipment, software
- learning by self-study
- learning from clients
- learning from external experts, suppliers
- learning from/with experienced colleagues
- learning by rotation of tasks
- learning by direct employee participation.

The two DTP'ers learn most from cooperation with experienced colleagues and their boss; they learn new things through the support they receive from experienced people and by asking for help/advice from colleagues. The solving of problems by themselves is also an important source of learning for them.

The entrepreneur indicates that the learning process in daily practice is especially important. Employees simply grow automatically in daily practice.

'But people also grow very well along with developments. I have a young personnel profile, but my eldest employee - she is about 55 - is still completely in the running. A bit more directed to what she can do well, but actually she still can handle much more. But she is still a little bit scared of computers, although she has already been working with them for 15 years. You can still see that difference with younger people, they have just grown up with computers ....'

The entrepreneur also has plans in the near future to give his employees the chance to learn from and with each other in joint training sessions in an attic that he will equip for this purpose.

'Here we always purchase new versions of software immediately. We like to have the latest version and they then select the options themselves with the help of magazines, tips, etc. They like to bring out the best in the software here and they try to find that out mostly together, or possibly with the help of customers, because some of them are very good at that. A few months ago in Arnhem we moved to a bigger building and we have an attic there where we can hold meetings. Now and then we go and sit down there in the evening with about eight people ... you learn the most from that ...'

4. RESULTS AND CONCLUSIONS

Introduction

Enterprises - small firms as well as big businesses - are operating in a rapidly changing environment. Entrepreneurs have to react to or rather to anticipate these changes in order to maintain or to improve the competitive strength of their firm. This makes high demands upon the entrepreneurs, in particular upon the small-business owners since they usually do not have departments of specialized staff.

How do small entrepreneurs manage? What kind of strategies do they apply in order to maintain or to improve their market position? What choices do they make regarding product-market combinations and the organization of work? How do they keep their own skills and competences and those of their staff up to date?

In this research we have studied these questions in 17 firms in four countries: Ireland, Finland, Spain and The Netherlands.

It is common knowledge that the printing industry is confronted with enormous changes and developments. Our sample of 17 micro-print firms illustrates that, even within the category of micro-print firms, there exists a wide variety in firms. Some firms are of the so-called self-employed type: the workforce is no more than the entrepreneur himself and one or two family members. In other firms the owner is also a small employer. Some firms have already been in operation for more than half a century, while other firms have recently been started up. Furthermore, in our sample there are firms which concentrate on (traditional) press activities and other firms which specialize on pre-press work. This indicates that there is also a wide variety of modes of strategic positioning and business success scores. Very relevant for this study are the differences in the organization of work and in continuing vocational training activities and incidental learning possibilities and methods. Of course there is a relationship between the firms' market position and policy issues like the organization of work and the training of staff. With regard to the market position of the 17 print firms, we can distinguish four typical positions: defence, midfield, forward and centre. In chapter 3 we have illustrated in detail the relations between market position, work organization and training with help of four firms. These four firms are in fact representative of the four different market positions.

In this chapter we will take a more analytical approach and formulate the main results and conclusions of this study from a more abstract, synthetic point of view.

Small printing firms: strategy and development

In total 17 micro-printing firms were studied. The size of the firms, measured by the number of persons active in the enterprise - including owner, family members and employees - varies from 3 to 10 (see figure 4.1). In Finland 5 cases were studied because in one of the firms the employees did not answer the questionnaires. When they did respond later another case had been already selected.

Figure 4.1: Some characteristics of the 17 printing firms studied

Country	Case No	Most important activity	Number of employees	Typology of (market) strategy
Ireland	1	digital printing	4	centre
	2	press	10	forward
	3	pre-press/press	8	midfield
	4	pre-press	6	forward
Finland	1	press	10	defence
	2	pre-press/press/after-press	7	defence
	3	pre-press	7	defence
	4	press/after-press	4	defence
	5	pre-press/press	8	midfield
Netherlands	1	pre-press/press	10	forward
	2	pre-press	6 (15) [1]	centre
	3	press	10	midfield
	4	press	5	defence
Spain	1	press	3	defence
	2	pre-press	7 [2]	forward
	3	press	5	midfield
	4	pre-press	7	forward

[1] 6 in studied site; 9 employees at two other sites

[2] cooperative: 6 members and 1 employee

In figure 4.1 the result of the selection of cases is presented. It is clear that more firms with 6-10 employees are studied (12) than firms with 1-5 employees (5).

Five pre-press firms participated in the project, 7 press firms and 5 with a mix of activities (3 pre-press, 1 press/after-press and 1 pre-press/press/after-press). Given the goal of the selection, this is a good representation of the different types in micro-printing firms.

Typology of strategy

Reading and analysing the cases it may be concluded that the differences between the studied cases have less to do with the country-specific situation and more to do with size of the firm. Relevant differences are related to the main activities of the firm (that means pre-press, press or a combination), the technological developments specific to the pre-press and press firms, the competitive situation in which the firms have to operate and the way in which the entrepreneur reacts and adapts his firm. The central differentiating factor in the cases studied is the way in which the firms operate strategically. Schumpeter sees two types of firms in this regards: the dynamic and non-dynamic firm. On the basis of the empirical data in this project, we have discerned a more detailed typology. We have used the different position of a football team to describe the types we have discerned in the case-studies: defence, midfield, forward and centre firms.

In figure 4.1 in the last column we have presented the scores from the cases in this typology. As can be seen here, the various types are present in all the countries, except

Finland. In Finland more firms in defence are studied. This certainly has to do with the fact that the Finnish case-studies tend to be situated in smaller cities/villages with smaller print markets. The financial strength of these firms is usually limited. They are unable to invest in expensive new technologies, which they generally do not need to maintain their position in their current markets. These firms are vulnerable to competition from outside.

According to the information of the Finnish researchers, there are certainly more dynamic small firms, but if they are successful they often grow (to over 10 employees) or are taken over by other firms. So in Finland a large proportion of micro-printing firms (and as we will show in the next paragraph, a relatively large proportion of all Finnish printing firms are micro-firms), are in difficult position, in other words they are 'defenders'.

Figure 4.2: The relationship between the main activities of the firm and the firm dynamics of the 17 firms studied

	type of firms				
main activity	**in defence**	**midfield**	**forward**	**centre**	**total**
pre-press	1	-	3	1	5
press	3	2	1	1[1]	7
mixed pre/press/press	1	2	1	-	4
other	1	-	-	-	1
total	6	4	5	2	17

[1] *This concerns a digital printshop*

In figure 4.2 it is clear that the pre-press firms are more dynamic and the press firms less so. One of the press firms is very dynamic (a centre) but this is a very specific case. This Irish firm is in fact a shop that offers digital printing services to its clients as one of its services. It is a computer shop selling advanced and specialized computers (hardware and software) for graphical purposes. It is thus not a traditional printing firm innovating in the direction of digital printing, but for this firm digital printing is a logical extension of its computer activities.

Among the mixed firms the situation mostly is also 'mixed'. The press activities are mostly stable and the pre-press activities are developing. If there is a certain dynamism among these firms it mostly concerns the pre-press part of the firm.

The concentration of developments/dynamics in pre-press firms/activities is certainly related to the technological developments in printing industry. Offset technology is almost exclusively used in small press firms, and this technology has only existed for about 25 years and has in principle not changed much. This technology based on water-ink has of course been refined and improved and presses are faster, etc. Recently, the machine-processing of these presses has been computerized (changing plates, inking, etc.) which results in greater efficiency and higher capacities. But it is not surprising that small printshops are very careful about investing in this new technology. They usually do not have the possibility of extending their markets so that they can make their high investments (these machines are very expensive) profitable.

In the case-studies done in the four countries participating in this project, none of the printshops had this new generation of presses and most of the entrepreneurs took a wait-and-see attitude towards this technology.

In pre-press technology, however, changes are happening fast in all the various process steps and in the equipment used. Firms in this segment at least have to follow the innovations or risk losing clients and/or markets. Besides 'normal' rapid changes in computer capacity and possibilities and 'normal' rapid updating of and change in software, there are three very important developments that we will mention here: *multi-media* etc. (i.e. electronic media and not paper; are used to carry the information), *computer-to-plate technology* and *digital printing*.

At the moment information that was traditionally communicated on paper is increasingly being communicated by electronic media (CD-ROM and Internet). It is clear that part of the traditional graphical market will be swallowed up by this electronic media. But pre-press firms which are qualified in managing/manipulating electronic data are certainly qualified to operate in this new market. In this case new qualifications are needed (electronics, system management). In case of the new of digital printing technology the situation is probably similar. The whole pre-press process stays the same - only the printing is new. At the moment digital printing is only competitive for smaller printruns (not film and plate making) but this technology is developing fast.

The computer-to-plate technology interferes perhaps least with the normal printing process but the traditional way of film and plate making will have consequences especially for small firms. Investment in computer-to-plate equipment is expensive and the question is whether small firms can afford this equipment. The situation is the same as for the newest offset technology. In general one can observe the same reaction from entrepreneurs in small firms: wait and see if, how and when it will have consequences.

Initial and continuing vocational training

In this study the focus is on the relationship between the organization of work in micro-printing firms on the one hand and the skills and skills development of the printers and the printer's assistants working in these firms on the other hand.

Initial vocational education

We have studied this relationship in 17 micro-print firms by means of interviews with the entrepreneur and written questionnaires for the employees. In total 90 employees actually filled in the questionnaire. Not all 90 employees are involved in the printing process:

- 28 printers
- 24 DTP (desk top publishing)
- 11 after-press
- 27 support staff.

In the analysis we have concentrated on the 63 employees doing real printing activities and we have left out the support staff.

Of the 63 employees involved in some way in the printing process, 23 (36%) have no initial vocational education for this sector. Most of them (18 of 23) do a DTP or an after-press job in their firms. Of the employees who do have an initial vocational education for this trade, the majority (27 of 40) only passed the lower/preparatory level.

Figure 4.3: ***Initial vocational education of the employees who participated in this research in the four countries***

	Spain	Ireland	Finland	The Netherlands	Total
Initial vocational education:					
• no initial vocational education	64%	58%	14%	27%	37%
• lower/preparatory vocational education	29%	8%	86%	20%	43%
• secondary vocational education	7%	25%	0%	20%	11%
• higher vocational education	0%	8%	0%	33%	9%
Total (= 100%)	14	12	22	15	63

There is a clear relationship between the initial vocational education of the employees who cooperated in this research and their nationality. Most employees without initial vocational education are Spanish or Irish. The employees with lower/preparatory vocational education are almost all Finnish and the employees with secondary or higher vocational education are mostly Dutch.

Continuing vocational training

Less than one third of the printers in the 17 firms studied have participated in courses during the last three years. This is remarkable, bearing in mind the technological developments in this sector in recent years.

Relationship between initial and continuing vocational training

In the interviews as well as in the questionnaires most attention was paid to continuing vocational training and other forms of learning by employees. But we also gathered data about *initial* vocational education because, as has been pointed out before, there exists a clear relationship between the participation of employees in continuing vocational training and their initial vocational education: the more initial education employees have had, the more they participated in continuing training.

This also is the case in our sample of 63 printers and printer's assistants, as figure 4.4 shows. Of the 23 employees without initial vocational education (for this sector), only 4 (13%) have participated in courses during the last three years. Printers with some form of initial vocational education for this sector have participated in courses more often; especially printers with a higher vocational education participate in courses.

Figure 4.4: Relationship between initial and continuing vocational training

	no initial vocational education	**lower/preparatory vocational education**	**secondary vocational education**	**higher vocational education**	**total**
participation in continuing vocational training during the last three years					
• Yes	13%	30%	43%	67%	29%
• No	87%	70%	57%	33%	71%
Total (=100%)	23	27	7	6	63

Position in the firm and education/training

Printers have educational backgrounds more related to the printing industry than employees doing DTP and after-press activities. With regard to participation in courses, there are no big differences between the three professional categories.

Figure 4.5: Vocational education/training and function

	Printer	DTP	after-press	Total
Initial vocational education				
• no initial vocational education	18%	50%	55%	36%
• lower-preparatory level	578%	33%	36%	43%
• secondary/higher level	25%	17%	9%	21%
Total (=100%)	28	24	11	63
Continuing vocational training				
• yes	32%	29%	18%	29%
• no	68%	71%	82%	71%
Total (=100%)	28	24	11	63

Incidental learning

Besides initial and continuing vocational training, other forms of learning are playing an important role in the process of keeping the qualifications of staff up to date. Earlier research in small enterprises has demonstrated that learning processes here are organized differently than in big firms and that incidental ways of learning are playing an important role in most small enterprises. The concept of 'informal learning' is often used in this context. However, we prefer to speak of incidental learning, however, because this learning occurs basically by using the available possibilities within normal daily work. In fact incidental learning contains informal as well as formal aspects. Sometimes the learning process takes place in a structured and sometimes in an unstructured way.

Variety in ways

In the questionnaires we asked the employees to fill in, there where 24 methods of incidental learning (see figure 4.6). The five most common ways of incidental learning were:

- learning by solving problems by oneself
- learning by solving problems together with colleagues
- learning by asking for help/advice from an experienced colleague
- learning by direct employee participation
- learning new things under the responsibility of the boss or an experienced worker.

Other methods of incidental learning, such as visits to trade fairs and to other repair workshops, are applicable only to a minority of the workers in the micro-printing firms studied. Half of the workers questioned said that they would like to have (more) opportunities to participate in trips and to visit fairs. Also, half of the workers state that they would like to have more opportunities to learn new things by practising with new machines, hardware or software. In fact, for all 24 methods of incidental learning, one quarter to one half of the 63 employees claim that they would like more opportunities to learn in such a way.

Importance for skill development

An important question is how much the workers learn from the different ways of incidental learning in figure 4.6. According to the workers, the following ways are very effective in the sense that they learn a lot from them:

- learning by using handbooks/manuals, etc.
- learning by asking for help or advice from an immediate superior
- learning by solving problems by oneself
- learning by doing work with a growing degree of difficulty
- learning new things with the help of an experienced colleague.

All these ways of incidental learning, i.e. opportunities for printers to improve their competences and skills, have to do with the organization of work in the printing firm. These outcomes demonstrate that the opportunities and possibilities for employees to update their skills and to develop (new) skills are closely related to the way the work in the firm is organized.

Figure 4.6: Learning at and through work (ways of incidental learning)

Method/form of learning	1. Occurs:				2. effectiveness*
	often	now and then	nearly never	total (N= 100%)	
1. learning new things under the responsibility of the boss or an experienced worker	29%	45%	26%	58	47%
2. learning new things with the help of an experienced colleague	20%	33%	47%	55	73%
3. learning by doing work with a growing degree of difficulty	33%	28%	39%	57	74%
4. learning by using handbooks, manuals, etc.	24%	36%	41%	59	83%
5. learning by asking for help/advice from an immediate superior	22%	45%	33%	58	77%
6. learning by asking for help/advice from an experienced colleague	25%	54%	21%	56	71%
7. learning by asking for help/advice from a supplier	2%	38%	60%	55	-
8. learning by asking for help/advice from experts in other printing firm or a specialized firm	7%	18%	75%	57	-
9. learning by asking for help/advice from the technical division of importer/supplier	5%	37%	58%	38**	
10. learning by solving problems by yourself	62%	31%	7%	61	76%
11. learning by practising with new machines/hardware/ software	19%	34%	47%	59	70%
12. learning by visiting other printing shops	2%	18%	81%	57	-
13. learning by trips/visits to fairs	4%	33%	63%	57	-
14. learning by regular rotation of tasks which can keep your skills up to date	16%	33%	51%	55%	-
15. learning from suppliers' instructions	7%	46%	46%	54	-
16. learning by doing non-routine jobs	24%	43%	33%	54	58%
17. learning by solving problems together with colleagues	26%	60%	14%	57	57%
18. learning by explanations from experts/experienced people	15%	51%	34%	53	-
19. learning by direct employee participation	28%	48%	24%	54	33%
20. learning from experiences of clients/ users of products	9%	26%	64%	53	-
21. learning from complaints of clients	12%	39%	48%	56	-
22. learning by involvement in management, planning, etc.	18%	33%	49%	55	30%
23. learning by self-study from text-books of apprentices, etc.	11%	28%	60%	53	-
24. learning by doing jobs on your own in your own time	6%	21%	74%	53	-

* *Score of effectiveness: % of workers who claim that they learn a lot from this way of incidental learning. The effectiveness score has been calculated only for the workers who mention that the particular way of incidental learning occurs* often *in their situation. Example: 17 (29%) of 58 workers state that they often learn new things under the responsibility of the boss or an experienced mechanic. Of these, 17 mechanics 47% (8 workers) say that they learn a lot in this way. If less than 10 workers mention that a particular method of incidental learning occurs often, the effectiveness score has not been calculated.*

** *This item was left out in the Finnish questionnaire.*

Another important outcome is that, according to half or more of the employees, the following ways of incidental learning are not very effective:

- learning by involvement in management, planning, etc.
- learning from experiences of clients/users of products.

Incidental learning and vocational education/training

In the last paragraph we described the relationship between initial vocational education and participation in courses. Employees with initial vocational education for the printing industry participate more often in *continuing* vocational training than workers without initial vocational education.

In general there are a lot of similarities in the incidental ways of learning applied by those employees with and those without initial vocational education for the printing industry. Both categories use a variety of incidental ways of learning. There is, however, one striking difference between the two categories of employees and this has to do with the intensity of the use they make of external experts. Employees with initial vocational education for the printing industry apply the following ways of incidental learning more often than their colleagues without an initial education geared towards this sector:

- Learning by asking for help/advice from suppliers
- Learning by asking for help/advice from experts in other printing firms or specialized firms
- Learning by visiting other printing enterprises
- Learning by explanations from experts/experienced people
- Learning by self-study from text-books of apprentices.

We know that for professions which require a lot of vocational education and training, professional (training) organizations and colleagues (peers) play an important role in developing the profession and in keeping the members up to date. These outside organizations and peers have far more influence on the continuous training (needs) of their members than the firms in which they work. This dominance of outside organizations is very obvious in the case of professionals such as doctors, lawyers, etc. In this study we detect elements of this in the printing industry. This is not surprising when we remember that the printer's trade is very old and has a long tradition when it comes to the education and training of its members. One of the characteristics of a profession is that the members themselves define the professional (quality) standards. In this study several *entrepreneurs* are signalling that the market is coming to have a greater say in the price quality relationship of products on the printing industry. Not all customers strive for highest quality standards and a lot of them prefer a lower quality for a lower product price. For printers this can create tension between professional standards and commercial factors. This tension basically has to do with different expectations from peers/colleagues and from the buyers/users of the products: the customers.

Figure 4.7: ***Incidental learning methods, broken down by the participation of employees in courses (% 'occurs often' and 'occurs now and then')***

	Participation in courses during the last three years		
	yes	no	total
Ways of incidental learning			
1. learning new things under the responsibility of the boss or an experienced worker	81%	71%	74%
2. learning new things with the help of an experienced worker	40%	58%	53%
3. learning by doing work with a growing degree of difficulty	63%	61%	61%
4. learning by using handbooks, manuals, etc.	71%	55%	59%
5. learning by asking for help/advice from an immediate superior	75%	64%	67%
6. learning by asking for help/advice from an experienced colleague	81%	78%	79%
7. learning by asking for help/advice from a supplier	47%	38%	40%
8. learning by asking for help/advice from experts in another print firm or specialized firm	57%	40%	25%
9. learning by asking for help/advice from the technical division of a (hardware/software) importer/supplier	75%	33%	42%
10. learning by solving problems by yourself	94%	93%	93%
11. learning by practising with new machines/hardware/software	53%	52%	53%
12. learning by visiting other printing firms	40%	12%	19%
13. learning by trips/visits to fairs	33%	38%	37%
14. learning by regular rotation of tasks which can keep your skills up to date	40%	53%	49%
15. learning from suppliers' instructions	57%	53%	54%
16. learning by doing non-routine jobs	86%	60%	67%
17. learning by solving problems together with colleagues	80%	88%	86%
18. learning from the explanations of experts/experienced people	60%	68%	66%
19. learning by direct employee participation	57%	83%	76%
20. learning from the experiences of clients/users of products	40%	34%	36%
21. learning from complaints of clients	50%	52%	52%
22. learning by involvement in management, planning, etc.	57%	49%	51%
23. learning by self-study from the text-books of apprentices, etc.	57%	33%	40%
24. learning by doing jobs for yourself in your own time	50%	18%	26%

As said before, only a small minority (29%) of the employees who filled in the questionnaire had participated in courses during the last three years. As figure 4.7 illustrates, there are not only similarities but also differences in incidental learning between employees who do and employees who do not participate in continuous vocational training. Employees who do participate in courses mention the following ways of incidental learning more often:

- learning by asking for help/advice from experts in other printing firms or specialized firms
- learning by asking for help/advice from a (hardware/software) importer/supplier
- learning by visiting other printing firms
- learning by doing non-routine jobs
- learning by self-study from the text-books of apprentices, etc.
- learning by doing jobs in one's own time.

There are also two ways of incidental learning that are applied more often by employees who do not (on a more or less regular basis) participate in courses:

- learning new things through helping an experienced colleague
- learning by direct employee participation.

Participating in continuous vocational training is only one way of acquiring new knowledge and skills from people outside one's own firm. The results described above indicate that some employees' attempts to improve their knowledge and skills or to keep them up to date are more oriented towards the world outside their firm than those of other employees. They not only participate in external courses but they have 'learning contacts' with several people outside their own firm: colleagues and experts in other print firms, importers, suppliers, etc. Other employees rely on or are dependent on their own firm for keeping their knowledge and skills up to date.

Incidental learning and type of function/firm

The employees in the firms studied can be divided into three vocational categories: printers, DTP and after-press. As figure 4.8 demonstrates, the employees in these three categories differ to a great extent in the ways in which they learn at work. This figure indicates that the work (situation) of DTP employees provides them with more learning opportunities than is the case for printers and for employees doing after-press tasks. In particular they mention the following ways of incidental learning more often:

- learning by doing work with a growing degree of difficulty
- learning by asking for help/advice from experienced colleagues
- learning by practising with new machines, hardware, software

learning from the experiences of clients and/or users of products.

Figure 4.8: Incidental learning methods, broken down by vocational category
(% 'occurs often' and 'occurs now and then')

	Vocational category			
	printer	DTP	after-press	total
Method/form of learning:				
1. learning new things under the responsibility of the boss or an experienced worker	56	86	91	74
2. learning new things with the help of an experienced worker	44	65	50	53
3. learning by doing work with a growing degree of difficulty	48	82	50	61
4. learning by using handbooks, manuals, etc.	48	71	64	59
5. learning by asking for help/advice from immediate superior	54	82	70	67
6. learning by asking for help/advice from an experienced colleague	64	100	70	79
7. learning by asking for help/advice from a supplier	60	32	9	40
8. learning by asking for help/advice from experts in another print firm or specialized firm	31	20	18	25
9. learning by asking for help/advice from the technical division of a (hardware/software) importer/supplier	62	44	0	42
10. learning by solving problems by yourself	89	96	100	93
11. learning by practising with new machines/hardware/software	36	78	36	53
12. learning by visiting other printing firms	27	10	18	19
13. learning by trips/visits to fairs	42	35	27	37
14. learning by regular rotation of tasks which can keep skills up to date	52	40	60	49
15. learning from suppliers' instructions	56	58	40	54
16. learning by doing non-routine jobs	63	68	73	67
17. learning by solving problems together with colleagues	81	86	100	86
18. learning from the explanations of experts/experienced people	67	74	50	66
19. learning by direct employee participation	79	80	60	76
20. learning from the experiences of clients/users of products	33	58	0	36
21. learning from complaints of clients	58	58	27	52
22. learning by involvement in management, planning, etc.	40	58	64	51
23. learning by self-study from text-books of apprentices, etc.	38	50	27	40
24. learning by doing jobs on your own in your own time	8	44	36	26

Here, it is clear that DTP employees often have to make their products in consultation and negotiation with customers and that they are more or less constantly confronted with new hardware and software. Similarly, they have to explore the new possibilities and opportunities provided by these devices on their own because good training is not always available when new hardware or software is launched on the market.

We have divided the 17 printing firms into four categories: defence, midfield, forward and centre. It is obvious that employers in dynamic printing firms, i.e. firms operating in the frontline of the new developments in the printing and multimedia sector, offer their employees more opportunities to learn than do firms which are lagging behind (see figure

4.1). The results in the case-studies are important here. In these case-studies we have found convincing evidence that in most cases the relationship is also the other way around: the skills of the employees, and in particular their flexibility and creativity and their readiness and eagerness to explore new possibilities via different ways of incidental learning, are an indispensable condition for firms in this sector to operate in the frontline.

Figure 4.9: Ways of incidental learning, broken down by type of firm

	in defence	mid- field	forward/ centre	total never
Method/form of learning				
1. learning new things under the responsibility of the boss or an experienced mechanic	56	92	85	74
2. learning new things with the help of an experienced colleague	23	85	65	53
3. learning by doing work with a growing degree of difficulty	42	77	75	61
4. learning by using handbooks, manuals, etc.	56	50	70	59
5. learning by asking for help/advice from an immediate superior	39	93	81	67
6. learning by asking for help/advice from an experienced colleague	64	85	90	79
7. learning by asking for help/advice from a supplier	48	31	37	40
8. learning by asking for help/advice from experts in another printing firm or specialized firm	26	21	25	25
9. learning by asking for help/advice from the technical division of importer/supplier	47	43	38	42
10. learning by solving problems by yourself	88	93	100	93
11. learning by practising with new machines/hardware/software	52	23	71	53
12. learning by visiting other printing shops	26	21	10	19
13. learning by trips/visits to fairs	33	36	42	37
14. learning by regular rotation of tasks which can keep skills up to date	39	62	53	49
15. learning from suppliers instructions	67	57	37	54
16. learning by doing non-routine jobs	68	69	63	67
17. learning by solving problems together with colleagues	83	86	89	86
18. learning from the explanations of experts/experienced people	43	92	74	66
19. learning by direct employee participation	73	85	74	76
20. learning from experiences of clients/users of cars	27	38	44	36
21. learning from complaints of clients	48	64	47	52
22. learning by involvement in management, planning, etc.	30	64	67	51
23. learning by self-study from text-books of apprentices, etc.	32	38	50	40
24. learning by doing jobs on your own in your own time	23	31	28	26

In fact, our analysis indicates that the relationship between work and learning in micro-enterprises in the printing industry is a very complicated one.

- The initial vocational education geared towards the printing industry with which people enter the labour-market is of relevance, in particular in more or less traditional professions like the printer's profession.
- The pace at which changes are occurring in the printing industry/multimedia sector means that firms have to rely to some extent on the skills and in particular on the capacity of their employees to learn in order to maintain their firm in the midfield or the frontline.
- As is often the case in sectors confronted with a very dynamic environment there are situations in which the courses available cannot fully keep pace with the latest developments. This implies that the entrepreneurs have to make the best of the learning capacities of their employees and on the learning opportunities in their daily work.

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Work and learning in micro-enterprises in the printing industry

A comparative research study into the relationship between technological and organisational developments and training activities in micro-enterprises in the printing industry in four European countries

Harry van den Tillaart, Sjaak van den Berg, John Wamerdam

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How does learning take place in micro-enterprises?

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Those are the main questions this report tries to answer taking the case of the printing sector in four EU Member States (Spain, Ireland, the Netherlands and Finland).

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